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Letter  
Circular  
LC 101

U. S. PETROLEUM OIL TABLES

Prepared by

The U. S. Bureau of Standards

Adopted by

The American Petroleum Institute,  
The U. S. Bureau of Mines, and  
The U. S. Bureau of Standards.

VOLUME AT 60° F OCCUPIED BY UNIT VOLUME AT INDICATED TEMPERATURE

This table shows the volume occupied at 60° F by a quantity of oil of any A. P. I. gravity at 60° F occupying unit volume at the indicated temperatures. For example, if at 60° F the A. P. I. gravity of the oil is 22, one gallon of this oil measured at 105° F will have a volume of 0.9822 gallons at 60° F.

The values given in the body of the table are in the form of "Multipliers", that is, the volume of oil at the indicated temperature and degrees A. P. I. multiplied by the corresponding factor in the table equals the volume at 60° F. For example, if the A. P. I. gravity of an oil at 60° F equals 22, and the volume at 105° F equals 5600 gallons, then the volume at 60° F equals  $5600 \times .9822$  or 5510.32 gallons.

This table can also be used to calculate the percentage change of volume to reduce to 60° F. The percentage factor is 100 times the difference between the tabulated value and unity. For example, in the case given above, the percentage factor is  $100(1.0000 - 0.9822) = 1.78$ . That is, any volume of an oil of 22 degrees A. P. I. at 60° F measured at 105° F will decrease in volume by 1.78 percent on being reduced to a temperature of 60° F. For observed temperatures below 60° F the volume correction should be added to the measured volumes; for temperatures above 60° F it should be subtracted.

This table is based upon the results of an investigation conducted by the Bureau of Standards on the "Density and Thermal Expansion of American Petroleum Oils" and published as Technologic Paper No. 77. The same data were used in computing the tables published in Bureau of Standards Circular No. 57, "United States Standard Tables for Petroleum Oils".

It is the intention of the Bureau to publish, in the near future, this and other petroleum oil tables as a Bureau circular.



Observed  
tempera-  
ture in  
°F

	10	11	12	13	14	15	16	17	18	19
Volume at 60°F occupied by unit volume at indicated temperature										
65	0.9982	0.9982	0.9982	0.9981	0.9981	0.9981	0.9981	0.9981	0.9980	0.9980
66	.9978	.9978	.9978	.9977	.9977	.9977	.9977	.9977	.9976	.9976
67	.9975	.9975	.9974	.9974	.9973	.9973	.9973	.9973	.9972	.9972
68	.9971	.9971	.9971	.9970	.9970	.9970	.9970	.9970	.9969	.9969
69	.9968	.9968	.9967	.9967	.9966	.9966	.9966	.9966	.9965	.9965
70	.9964	.9964	.9963	.9963	.9962	.9962	.9962	.9962	.9961	.9961
71	.9960	.9960	.9959	.9959	.9958	.9958	.9958	.9958	.9957	.9957
72	.9957	.9956	.9956	.9955	.9955	.9954	.9954	.9954	.9953	.9953
73	.9953	.9953	.9952	.9952	.9951	.9951	.9951	.9950	.9950	.9949
74	.9950	.9949	.9949	.9948	.9948	.9947	.9947	.9946	.9946	.9945
75	.9946	.9945	.9945	.9944	.9944	.9943	.9943	.9942	.9942	.9941
76	.9942	.9941	.9941	.9940	.9940	.9939	.9939	.9938	.9938	.9937
77	.9939	.9938	.9938	.9937	.9937	.9936	.9935	.9935	.9934	.9934
78	.9935	.9934	.9934	.9933	.9933	.9932	.9932	.9931	.9931	.9930
79	.9932	.9931	.9931	.9930	.9930	.9929	.9928	.9928	.9927	.9927
80	.9928	.9927	.9927	.9926	.9926	.9925	.9924	.9924	.9923	.9923
81	.9924	.9923	.9923	.9922	.9922	.9921	.9920	.9920	.9919	.9919
82	.9921	.9920	.9919	.9919	.9918	.9917	.9916	.9916	.9915	.9915
83	.9917	.9916	.9916	.9915	.9915	.9914	.9913	.9912	.9912	.9911
84	.9914	.9913	.9912	.9912	.9911	.9910	.9909	.9908	.9908	.9907
85	.9910	.9909	.9908	.9908	.9907	.9906	.9905	.9904	.9904	.9903
86	.9906	.9905	.9904	.9904	.9903	.9902	.9901	.9900	.9900	.9899
87	.9903	.9902	.9901	.9900	.9899	.9898	.9897	.9896	.9896	.9895
88	.9899	.9898	.9897	.9897	.9896	.9895	.9894	.9893	.9893	.9892
89	.9896	.9895	.9894	.9893	.9892	.9891	.9890	.9889	.9889	.9888
90	.9892	.9891	.9890	.9889	.9888	.9887	.9886	.9885	.9885	.9884
91	.9888	.9887	.9886	.9885	.9884	.9883	.9882	.9881	.9881	.9880
92	.9885	.9884	.9883	.9881	.9880	.9879	.9878	.9877	.9877	.9876
93	.9881	.9880	.9879	.9878	.9877	.9876	.9875	.9874	.9873	.9872
94	.9878	.9877	.9876	.9874	.9873	.9872	.9871	.9870	.9869	.9868
95	.9874	.9873	.9872	.9870	.9869	.9868	.9867	.9866	.9865	.9864
96	.9870	.9869	.9868	.9866	.9865	.9864	.9863	.9862	.9861	.9860
97	.9867	.9866	.9865	.9863	.9862	.9861	.9860	.9859	.9857	.9856
98	.9863	.9862	.9861	.9859	.9858	.9857	.9856	.9855	.9854	.9853
99	.9860	.9859	.9858	.9856	.9855	.9854	.9853	.9852	.9850	.9849
100	.9856	.9855	.9854	.9852	.9851	.9850	.9849	.9848	.9846	.9845
101	.9852	.9851	.9850	.9848	.9847	.9846	.9845	.9844	.9842	.9841
102	.9849	.9848	.9846	.9845	.9843	.9842	.9841	.9840	.9838	.9837
103	.9845	.9844	.9843	.9841	.9840	.9839	.9838	.9837	.9835	.9834
104	.9842	.9841	.9839	.9838	.9836	.9835	.9834	.9833	.9831	.9830
105	.9838	.9837	.9835	.9834	.9832	.9831	.9830	.9829	.9827	.9826
106	.9834	.9833	.9831	.9830	.9828	.9827	.9826	.9825	.9823	.9822
107	.9831	.9830	.9828	.9827	.9825	.9824	.9823	.9821	.9820	.9818
108	.9827	.9826	.9824	.9823	.9821	.9820	.9819	.9818	.9816	.9815
109	.9824	.9823	.9821	.9820	.9818	.9817	.9816	.9814	.9813	.9811
110	.9820	.9819	.9817	.9816	.9814	.9813	.9812	.9810	.9809	.9807
111	.9816	.9815	.9813	.9812	.9810	.9809	.9808	.9806	.9805	.9803
112	.9813	.9811	.9810	.9808	.9807	.9805	.9804	.9802	.9801	.9799
113	.9809	.9808	.9806	.9805	.9803	.9802	.9800	.9799	.9797	.9796
114	.9806	.9804	.9803	.9801	.9800	.9798	.9796	.9795	.9793	.9792
115	.9802	.9800	.9799	.9797	.9796	.9794	.9792	.9791	.9789	.9788
116	.9799	.9797	.9795	.9794	.9792	.9790	.9788	.9789	.9785	.9784
117	.9795	.9793	.9792	.9790	.9789	.9787	.9785	.9783	.9782	.9780
118	.9792	.9790	.9788	.9787	.9785	.9783	.9781	.9780	.9778	.9777
119	.9788	.9786	.9785	.9783	.9782	.9780	.9778	.9776	.9775	.9773
120	.9785	.9783	.9781	.9780	.9778	.9776	.9774	.9772	.9771	.9769
121	.9781	.9779	.9777	.9776	.9774	.9772	.9770	.9768	.9767	.9765
122	.9778	.9776	.9774	.9772	.9770	.9768	.9766	.9764	.9763	.9761
123	.9774	.9772	.9770	.9769	.9767	.9765	.9763	.9761	.9760	.9758
124	.9771	.9769	.9767	.9765	.9763	.9761	.9759	.9757	.9756	.9754
125	.9767	.9765	.9763	.9761	.9759	.9757	.9755	.9753	.9752	.9750
126	.9764	.9762	.9760	.9757	.9755	.9753	.9751	.9749	.9748	.9746
127	.9760	.9758	.9756	.9754	.9752	.9750	.9748	.9746	.9744	.9742
128	.9757	.9755	.9753	.9750	.9748	.9746	.9744	.9742	.9741	.9739
129	.9753	.9751	.9749	.9747	.9745	.9743	.9741	.9739	.9737	.9735





Observed tempera- ture in °F	10	11	12	13	14	15	16	17	18	19
	Volume at 60°F occupied by unit volume at indicated temperature									
130	.9750	.9746	.9746	.9743	.9741	.9739	.9737	.9735	.9733	.9731
131	.9746	.9744	.9742	.9739	.9737	.9735	.9733	.9731	.9729	.9737
132	.9743	.9741	.9739	.9736	.9734	.9732	.9730	.9728	.9725	.9723
133	.9739	.9737	.9735	.9732	.9730	.9728	.9726	.9724	.9722	.9720
134	.9736	.9734	.9732	.9729	.9727	.9725	.9723	.9721	.9718	.9716
135	.9732	.9730	.9728	.9725	.9723	.9721	.9719	.9717	.9714	.9712
136	.9729	.9727	.9724	.9722	.9719	.9717	.9715	.9713	.9710	.9708
137	.9725	.9723	.9721	.9718	.9716	.9714	.9712	.9709	.9707	.9704
138	.9722	.9720	.9717	.9715	.9712	.9710	.9708	.9706	.9703	.9701
139	.9718	.9716	.9714	.9711	.9709	.9707	.9705	.9702	.9700	.9697
140	.9715	.9713	.9710	.9708	.9705	.9703	.9701	.9698	.9696	.9693
141	.9712	.9709	.9707	.9704	.9702	.9699	.9697	.9694	.9692	.9689
142	.9708	.9706	.9703	.9701	.9698	.9696	.9693	.9691	.9688	.9686
143	.9705	.9702	.9700	.9697	.9695	.9692	.9690	.9687	.9685	.9682
144	.9701	.9699	.9696	.9694	.9691	.9689	.9686	.9684	.9681	.9679
145	.9698	.9695	.9693	.9690	.9688	.9685	.9682	.9680	.9677	.9675
146	.9694	.9691	.9689	.9686	.9684	.9681	.9678	.9676	.9673	.9671
147	.9691	.9688	.9685	.9683	.9680	.9677	.9674	.9672	.9669	.9667
148	.9687	.9684	.9682	.9679	.9677	.9674	.9671	.9669	.9666	.9664
149	.9684	.9681	.9678	.9676	.9673	.9670	.9667	.9665	.9662	.9660
150	.9680	.9677	.9674	.9672	.9669	.9666	.9663	.9661	.9658	.9656
151	.9677	.9674	.9671	.9668	.9665	.9662	.9659	.9657	.9654	.9652
152	.9673	.9670	.9667	.9665	.9662	.9659	.9656	.9653	.9651	.9648
153	.9670	.9667	.9664	.9661	.9658	.9655	.9652	.9650	.9647	.9645
154	.9666	.9663	.9660	.9658	.9655	.9652	.9649	.9646	.9644	.9641
155	.9663	.9660	.9657	.9654	.9651	.9648	.9645	.9642	.9640	.9637
156	.9660	.9657	.9654	.9650	.9647	.9644	.9641	.9638	.9636	.9633
157	.9656	.9653	.9650	.9647	.9644	.9641	.9638	.9635	.9632	.9629
158	.9653	.9650	.9647	.9643	.9640	.9637	.9634	.9631	.9629	.9626
159	.9649	.9646	.9643	.9640	.9637	.9634	.9631	.9628	.9625	.9622
160	.9646	.9643	.9640	.9636	.9633	.9630	.9627	.9624	.9621	.9618
161	.9643	.9640	.9636	.9633	.9629	.9626	.9623	.9620	.9617	.9614
162	.9639	.9636	.9633	.9629	.9626	.9623	.9620	.9617	.9614	.9611
163	.9636	.9633	.9629	.9626	.9622	.9619	.9616	.9613	.9610	.9607
164	.9632	.9629	.9626	.9622	.9619	.9616	.9613	.9610	.9607	.9604
165	.9629	.9626	.9622	.9619	.9615	.9612	.9609	.9606	.9603	.9600
166	.9626	.9622	.9619	.9615	.9612	.9608	.9605	.9602	.9599	.9596
167	.9622	.9619	.9615	.9612	.9608	.9605	.9602	.9599	.9595	.9592
168	.9619	.9615	.9612	.9608	.9605	.9601	.9598	.9595	.9592	.9589
169	.9615	.9612	.9608	.9605	.9601	.9598	.9595	.9592	.9588	.9585
170	.9612	.9608	.9605	.9601	.9598	.9594	.9591	.9588	.9584	.9581
171	.9609	.9605	.9601	.9598	.9594	.9590	.9587	.9584	.9580	.9577
172	.9605	.9601	.9598	.9594	.9591	.9587	.9584	.9580	.9577	.9573
173	.9602	.9598	.9594	.9591	.9587	.9583	.9580	.9577	.9573	.9570
174	.9598	.9594	.9591	.9587	.9584	.9580	.9577	.9573	.9570	.9566
175	.9595	.9591	.9587	.9584	.9580	.9576	.9573	.9569	.9566	.9562
176	.9592	.9588	.9584	.9580	.9576	.9572	.9569	.9565	.9562	.9558
177	.9588	.9584	.9580	.9577	.9573	.9569	.9565	.9562	.9558	.9555
178	.9585	.9581	.9577	.9573	.9569	.9565	.9562	.9558	.9555	.9551
179	.9581	.9577	.9573	.9570	.9566	.9562	.9558	.9555	.9551	.9548
180	.9578	.9574	.9570	.9566	.9562	.9558	.9554	.9551	.9547	.9544
181	.9575	.9571	.9567	.9563	.9559	.9555	.9551	.9547	.9544	.9540
182	.9571	.9567	.9563	.9559	.9555	.9551	.9547	.9544	.9540	.9537
183	.9568	.9564	.9560	.9556	.9552	.9548	.9544	.9540	.9537	.9533
184	.9564	.9560	.9556	.9552	.9548	.9544	.9540	.9537	.9533	.9530
185	.9561	.9557	.9553	.9549	.9545	.9541	.9537	.9533	.9530	.9526
186	.9558	.9554	.9550	.9545	.9541	.9537	.9533	.9529	.9526	.9522
187	.9554	.9550	.9546	.9542	.9536	.9534	.9530	.9526	.9522	.9518
188	.9551	.9547	.9543	.9538	.9534	.9530	.9526	.9522	.9519	.9515
189	.9547	.9543	.9539	.9535	.9531	.9527	.9523	.9519	.9515	.9511
190	.9544	.9540	.9536	.9531	.9527	.9523	.9519	.9515	.9511	.9507
191	.9541	.9537	.9532	.9528	.9523	.9519	.9515	.9511	.9507	.9503
192	.9537	.9533	.9529	.9524	.9520	.9516	.9512	.9508	.9504	.9500
193	.9534	.9530	.9525	.9521	.9516	.9512	.9508	.9504	.9500	.9496
194	.9530	.9526	.9522	.9517	.9512	.9508	.9504	.9500	.9496	.9492
195	.9527	.9523	.9518	.9514	.9509	.9505	.9501	.9497	.9493	.9489





Observed  
tempera-  
ture in  
°F

20 21 22 23 24 25 26 27 28 29

Volume at 60°F occupied by unit volume at indicated temperature

0	1.0239	1.0241	1.0242	1.0244	1.0245	1.0247	1.0249	1.0250	1.0252	1.0254
1	1.0235	1.0237	1.0238	1.0240	1.0241	1.0243	1.0245	1.0246	1.0248	1.0250
2	1.0231	1.0233	1.0234	1.0236	1.0237	1.0239	1.0241	1.0243	1.0244	1.0245
3	1.0227	1.0228	1.0230	1.0231	1.0232	1.0234	1.0236	1.0237	1.0239	1.0241
4	1.0223	1.0224	1.0226	1.0227	1.0228	1.0230	1.0232	1.0233	1.0235	1.0236
5	1.0219	1.0220	1.0222	1.0223	1.0224	1.0226	1.0228	1.0229	1.0231	1.0232
6	1.0215	1.0216	1.0218	1.0219	1.0220	1.0222	1.0224	1.0225	1.0227	1.0228
7	1.0211	1.0212	1.0214	1.0215	1.0216	1.0218	1.0220	1.0221	1.0223	1.0224
8	1.0207	1.0208	1.0210	1.0211	1.0212	1.0213	1.0215	1.0216	1.0218	1.0219
9	1.0203	1.0204	1.0206	1.0207	1.0208	1.0209	1.0211	1.0212	1.0214	1.0215
10	1.0199	1.0200	1.0202	1.0203	1.0204	1.0205	1.0207	1.0208	1.0210	1.0211
11	1.0195	1.0196	1.0198	1.0199	1.0200	1.0201	1.0203	1.0204	1.0206	1.0207
12	1.0191	1.0192	1.0194	1.0195	1.0196	1.0197	1.0199	1.0200	1.0202	1.0203
13	1.0187	1.0188	1.0189	1.0190	1.0191	1.0192	1.0194	1.0195	1.0197	1.0198
14	1.0183	1.0184	1.0185	1.0186	1.0187	1.0188	1.0190	1.0191	1.0193	1.0194
15	1.0179	1.0180	1.0181	1.0182	1.0183	1.0184	1.0186	1.0187	1.0189	1.0190
16	1.0175	1.0176	1.0177	1.0178	1.0179	1.0180	1.0182	1.0183	1.0185	1.0186
17	1.0171	1.0172	1.0173	1.0174	1.0175	1.0176	1.0178	1.0179	1.0181	1.0182
18	1.0167	1.0168	1.0169	1.0170	1.0171	1.0172	1.0173	1.0175	1.0176	1.0177
19	1.0163	1.0164	1.0165	1.0166	1.0167	1.0168	1.0169	1.0171	1.0172	1.0173
20	1.0159	1.0160	1.0161	1.0162	1.0163	1.0164	1.0165	1.0167	1.0168	1.0169
21	1.0155	1.0156	1.0157	1.0158	1.0159	1.0160	1.0161	1.0163	1.0164	1.0165
22	1.0151	1.0152	1.0153	1.0154	1.0155	1.0156	1.0157	1.0159	1.0160	1.0161
23	1.0147	1.0148	1.0148	1.0149	1.0150	1.0151	1.0152	1.0154	1.0155	1.0156
24	1.0143	1.0144	1.0144	1.0145	1.0146	1.0147	1.0148	1.0150	1.0151	1.0152
25	1.0139	1.0140	1.0140	1.0141	1.0142	1.0143	1.0144	1.0146	1.0147	1.0148
26	1.0135	1.0136	1.0136	1.0137	1.0138	1.0139	1.0140	1.0142	1.0143	1.0144
27	1.0131	1.0132	1.0132	1.0133	1.0134	1.0135	1.0136	1.0138	1.0139	1.0140
28	1.0127	1.0128	1.0128	1.0129	1.0130	1.0131	1.0132	1.0133	1.0134	1.0135
29	1.0123	1.0124	1.0124	1.0125	1.0126	1.0127	1.0128	1.0129	1.0130	1.0131
30	1.0119	1.0120	1.0120	1.0121	1.0122	1.0123	1.0124	1.0125	1.0126	1.0127
31	1.0115	1.0116	1.0116	1.0117	1.0118	1.0119	1.0120	1.0121	1.0122	1.0123
32	1.0111	1.0112	1.0112	1.0113	1.0114	1.0115	1.0116	1.0117	1.0118	1.0118
33	1.0107	1.0108	1.0108	1.0109	1.0109	1.0110	1.0111	1.0112	1.0113	1.0114
34	1.0103	1.0104	1.0104	1.0105	1.0105	1.0106	1.0107	1.0108	1.0109	1.0109
35	1.0099	1.0100	1.0100	1.0101	1.0101	1.0102	1.0103	1.0104	1.0105	1.0105
36	1.0095	1.0096	1.0096	1.0097	1.0097	1.0098	1.0099	1.0100	1.0101	1.0101
37	1.0091	1.0092	1.0092	1.0093	1.0093	1.0094	1.0095	1.0096	1.0097	1.0097
38	1.0087	1.0088	1.0088	1.0089	1.0089	1.0090	1.0091	1.0091	1.0092	1.0092
39	1.0083	1.0084	1.0084	1.0085	1.0085	1.0086	1.0087	1.0087	1.0088	1.0088
40	1.0079	1.0080	1.0080	1.0081	1.0081	1.0082	1.0083	1.0083	1.0084	1.0084
41	1.0075	1.0076	1.0076	1.0077	1.0077	1.0078	1.0079	1.0079	1.0080	1.0080
42	1.0071	1.0072	1.0072	1.0073	1.0073	1.0074	1.0075	1.0075	1.0076	1.0076
43	1.0067	1.0067	1.0068	1.0068	1.0068	1.0069	1.0070	1.0070	1.0071	1.0071
44	1.0063	1.0063	1.0064	1.0064	1.0064	1.0065	1.0066	1.0066	1.0067	1.0067
45	1.0059	1.0059	1.0060	1.0060	1.0060	1.0061	1.0062	1.0062	1.0063	1.0063
46	1.0055	1.0055	1.0056	1.0056	1.0056	1.0057	1.0058	1.0058	1.0059	1.0059
47	1.0051	1.0051	1.0052	1.0052	1.0052	1.0053	1.0054	1.0054	1.0055	1.0055
48	1.0047	1.0047	1.0048	1.0048	1.0048	1.0049	1.0049	1.0050	1.0050	1.0050
49	1.0043	1.0043	1.0044	1.0044	1.0044	1.0045	1.0045	1.0046	1.0046	1.0046
50	1.0039	1.0039	1.0040	1.0040	1.0040	1.0041	1.0041	1.0042	1.0042	1.0042
51	1.0035	1.0035	1.0036	1.0036	1.0036	1.0037	1.0037	1.0038	1.0038	1.0038
52	1.0031	1.0031	1.0032	1.0032	1.0032	1.0033	1.0033	1.0034	1.0034	1.0034
53	1.0027	1.0028	1.0028	1.0028	1.0028	1.0028	1.0028	1.0029	1.0029	1.0029
54	1.0024	1.0024	1.0024	1.0024	1.0024	1.0024	1.0024	1.0025	1.0025	1.0025
55	1.0020	1.0020	1.0020	1.0020	1.0020	1.0020	1.0020	1.0021	1.0021	1.0021
56	1.0016	1.0016	1.0016	1.0016	1.0016	1.0016	1.0016	1.0017	1.0017	1.0017
57	1.0012	1.0012	1.0012	1.0012	1.0012	1.0012	1.0012	1.0013	1.0013	1.0013
58	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008
59	1.0004	1.0004	1.0004	1.0004	1.0004	1.0004	1.0004	1.0004	1.0004	1.0004
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
61	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996
62	.9992	.9992	.9992	.9992	.9992	.9992	.9992	.9992	.9992	.9992
63	.9988	.9988	.9988	.9988	.9988	.9988	.9988	.9987	.9987	.9987
64	.9984	.9984	.9984	.9984	.9984	.9984	.9984	.9983	.9983	.9983





Degrees A.P.I. at 60°F

Observed  
tempera-  
ture in  
°F

20 21 22 23 24 25 26 27 28 29

Volume at 60°F occupied by unit volume at indicated temperature

65	0.9980	0.9980	0.9980	0.9980	0.9980	0.9980	0.9980	0.9979	0.9979	0.9979
66	.9976	.9976	.9976	.9976	.9976	.9976	.9976	.9975	.9975	.9975
67	.9972	.9972	.9972	.9972	.9972	.9972	.9972	.9971	.9971	.9971
68	.9969	.9969	.9968	.9968	.9968	.9967	.9967	.9966	.9966	.9966
69	.9965	.9965	.9964	.9964	.9964	.9963	.9963	.9962	.9962	.9962
70	.9961	.9961	.9960	.9960	.9960	.9959	.9959	.9958	.9958	.9958
71	.9957	.9957	.9956	.9956	.9956	.9955	.9955	.9954	.9954	.9954
72	.9953	.9953	.9952	.9952	.9952	.9951	.9951	.9950	.9950	.9950
73	.9949	.9949	.9948	.9948	.9948	.9947	.9947	.9946	.9946	.9946
74	.9945	.9945	.9944	.9944	.9944	.9943	.9943	.9942	.9942	.9942
75	.9941	.9941	.9940	.9940	.9940	.9939	.9939	.9938	.9938	.9938
76	.9937	.9937	.9936	.9936	.9936	.9935	.9935	.9934	.9934	.9934
77	.9933	.9933	.9932	.9932	.9932	.9931	.9931	.9930	.9930	.9929
78	.9930	.9929	.9929	.9928	.9928	.9927	.9926	.9926	.9925	.9925
79	.9926	.9925	.9925	.9924	.9924	.9923	.9922	.9922	.9921	.9920
80	.9922	.9921	.9921	.9920	.9920	.9919	.9918	.9918	.9917	.9916
81	.9918	.9917	.9917	.9916	.9916	.9915	.9914	.9914	.9913	.9912
82	.9914	.9913	.9913	.9912	.9912	.9911	.9910	.9910	.9909	.9908
83	.9910	.9909	.9909	.9908	.9908	.9907	.9906	.9905	.9904	.9903
84	.9906	.9905	.9905	.9904	.9904	.9903	.9902	.9901	.9900	.9899
85	.9902	.9901	.9901	.9900	.9900	.9899	.9898	.9897	.9896	.9895
86	.9898	.9897	.9897	.9896	.9896	.9895	.9894	.9893	.9892	.9891
87	.9894	.9893	.9893	.9892	.9892	.9891	.9890	.9889	.9888	.9887
88	.9891	.9890	.9889	.9888	.9887	.9886	.9885	.9884	.9883	.9882
89	.9887	.9886	.9885	.9884	.9883	.9882	.9881	.9880	.9879	.9878
90	.9883	.9882	.9881	.9880	.9879	.9878	.9877	.9876	.9875	.9874
91	.9879	.9878	.9877	.9876	.9875	.9874	.9873	.9872	.9871	.9870
92	.9875	.9874	.9873	.9872	.9871	.9870	.9869	.9868	.9867	.9866
93	.9871	.9870	.9869	.9868	.9867	.9866	.9865	.9864	.9863	.9862
94	.9867	.9866	.9865	.9864	.9863	.9862	.9861	.9860	.9859	.9858
95	.9863	.9862	.9861	.9860	.9859	.9858	.9857	.9856	.9855	.9854
96	.9859	.9858	.9857	.9856	.9855	.9854	.9853	.9852	.9851	.9850
97	.9855	.9854	.9853	.9852	.9851	.9850	.9849	.9848	.9847	.9846
98	.9852	.9851	.9849	.9848	.9847	.9846	.9845	.9843	.9842	.9841
99	.9848	.9847	.9845	.9844	.9843	.9842	.9841	.9839	.9838	.9837
100	.9844	.9843	.9841	.9840	.9839	.9838	.9837	.9835	.9834	.9833
101	.9840	.9839	.9837	.9836	.9835	.9834	.9833	.9831	.9830	.9829
102	.9836	.9835	.9833	.9832	.9831	.9830	.9829	.9827	.9826	.9825
103	.9833	.9832	.9830	.9829	.9828	.9826	.9824	.9823	.9821	.9820
104	.9829	.9828	.9826	.9825	.9824	.9822	.9820	.9819	.9817	.9816
105	.9825	.9824	.9822	.9821	.9820	.9818	.9816	.9815	.9813	.9812
106	.9821	.9820	.9818	.9817	.9816	.9814	.9812	.9811	.9809	.9808
107	.9817	.9816	.9814	.9813	.9812	.9810	.9808	.9807	.9805	.9804
108	.9814	.9812	.9811	.9809	.9808	.9806	.9804	.9803	.9801	.9799
109	.9810	.9808	.9807	.9805	.9804	.9802	.9800	.9799	.9797	.9795
110	.9806	.9804	.9803	.9801	.9800	.9798	.9796	.9795	.9793	.9791
111	.9802	.9800	.9799	.9797	.9796	.9794	.9792	.9791	.9789	.9787
112	.9798	.9796	.9795	.9793	.9792	.9790	.9788	.9787	.9785	.9783
113	.9794	.9792	.9791	.9789	.9788	.9786	.9784	.9782	.9780	.9778
114	.9790	.9788	.9787	.9785	.9784	.9782	.9780	.9778	.9776	.9774
115	.9786	.9784	.9783	.9781	.9780	.9778	.9776	.9774	.9772	.9770
116	.9782	.9780	.9778	.9777	.9776	.9774	.9772	.9770	.9768	.9766
117	.9778	.9776	.9775	.9773	.9772	.9770	.9768	.9766	.9764	.9762
118	.9775	.9773	.9771	.9769	.9768	.9766	.9764	.9761	.9759	.9757
119	.9771	.9769	.9767	.9765	.9764	.9762	.9760	.9757	.9755	.9753
120	.9767	.9765	.9763	.9761	.9760	.9758	.9756	.9753	.9751	.9749
121	.9763	.9761	.9759	.9757	.9756	.9754	.9752	.9749	.9747	.9745
122	.9759	.9757	.9755	.9753	.9752	.9750	.9748	.9745	.9743	.9741
123	.9756	.9754	.9752	.9750	.9748	.9746	.9744	.9741	.9739	.9737
124	.9752	.9750	.9748	.9746	.9744	.9742	.9740	.9737	.9735	.9733
125	.9748	.9746	.9744	.9742	.9740	.9738	.9736	.9733	.9731	.9729
126	.9744	.9742	.9740	.9738	.9736	.9734	.9732	.9729	.9727	.9725
127	.9740	.9738	.9736	.9734	.9732	.9730	.9728	.9725	.9723	.9721
128	.9737	.9735	.9732	.9730	.9728	.9726	.9723	.9721	.9718	.9716
129	.9733	.9731	.9728	.9726	.9724	.9722	.9719	.9717	.9714	.9712





Observed  
tempera-  
ture in  
°F

20 21 22 23 24 25 26 27 28 29

Volume at 60°F occupied by unit volume at indicated temperature

130	.9729	.9727	.9724	.9722	.9720	.9718	.9715	.9713	.9710	.9708
131	.9725	.9723	.9720	.9718	.9716	.9714	.9711	.9709	.9706	.9704
132	.9721	.9719	.9716	.9714	.9712	.9710	.9707	.9705	.9702	.9700
133	.9718	.9716	.9713	.9711	.9709	.9707	.9704	.9701	.9698	.9695
134	.9714	.9712	.9709	.9707	.9705	.9703	.9700	.9697	.9694	.9691
135	.9710	.9708	.9705	.9703	.9701	.9699	.9696	.9693	.9690	.9687
136	.9706	.9704	.9701	.9699	.9697	.9695	.9692	.9689	.9686	.9683
137	.9702	.9700	.9697	.9695	.9693	.9691	.9688	.9685	.9682	.9679
138	.9699	.9696	.9694	.9691	.9689	.9687	.9684	.9681	.9678	.9675
139	.9695	.9692	.9690	.9687	.9685	.9683	.9680	.9677	.9674	.9671
140	.9691	.9688	.9686	.9683	.9681	.9679	.9676	.9673	.9670	.9667
141	.9687	.9684	.9682	.9679	.9677	.9675	.9672	.9669	.9666	.9663
142	.9683	.9680	.9678	.9675	.9673	.9671	.9668	.9665	.9662	.9659
143	.9680	.9677	.9675	.9672	.9670	.9667	.9664	.9660	.9657	.9654
144	.9676	.9673	.9671	.9668	.9666	.9663	.9660	.9656	.9653	.9650
145	.9672	.9669	.9667	.9664	.9662	.9659	.9656	.9652	.9649	.9646
146	.9668	.9665	.9663	.9660	.9658	.9655	.9652	.9648	.9645	.9642
147	.9664	.9661	.9659	.9656	.9654	.9651	.9648	.9644	.9641	.9638
148	.9661	.9658	.9655	.9652	.9650	.9647	.9644	.9640	.9636	.9633
149	.9657	.9654	.9651	.9648	.9646	.9643	.9639	.9636	.9632	.9629
150	.9653	.9650	.9647	.9644	.9642	.9639	.9635	.9632	.9628	.9625
151	.9649	.9646	.9643	.9640	.9638	.9635	.9631	.9628	.9624	.9621
152	.9645	.9642	.9639	.9636	.9634	.9631	.9627	.9624	.9620	.9617
153	.9642	.9639	.9636	.9633	.9631	.9628	.9624	.9620	.9616	.9613
154	.9638	.9635	.9632	.9629	.9627	.9624	.9620	.9616	.9612	.9609
155	.9634	.9631	.9628	.9625	.9623	.9620	.9616	.9612	.9608	.9605
156	.9630	.9627	.9624	.9621	.9619	.9616	.9612	.9608	.9604	.9601
157	.9626	.9623	.9620	.9617	.9615	.9612	.9608	.9604	.9600	.9597
158	.9623	.9620	.9616	.9613	.9611	.9608	.9604	.9600	.9596	.9592
159	.9619	.9616	.9612	.9609	.9607	.9604	.9600	.9596	.9592	.9588
160	.9615	.9612	.9608	.9605	.9603	.9600	.9596	.9592	.9588	.9584
161	.9611	.9608	.9604	.9601	.9599	.9596	.9592	.9588	.9584	.9580
162	.9608	.9604	.9601	.9597	.9595	.9592	.9588	.9584	.9580	.9576
163	.9604	.9601	.9597	.9594	.9591	.9588	.9584	.9580	.9576	.9572
164	.9601	.9597	.9594	.9590	.9587	.9584	.9580	.9576	.9572	.9568
165	.9597	.9593	.9590	.9586	.9583	.9580	.9576	.9572	.9568	.9564
166	.9593	.9589	.9586	.9582	.9579	.9576	.9572	.9568	.9564	.9560
167	.9589	.9585	.9582	.9578	.9575	.9572	.9568	.9564	.9560	.9556
168	.9586	.9582	.9578	.9574	.9571	.9568	.9564	.9559	.9555	.9551
169	.9582	.9578	.9574	.9570	.9567	.9564	.9560	.9555	.9551	.9547
170	.9578	.9574	.9570	.9566	.9563	.9560	.9556	.9551	.9547	.9543
171	.9574	.9570	.9566	.9562	.9559	.9556	.9552	.9547	.9543	.9539
172	.9570	.9566	.9562	.9558	.9555	.9552	.9548	.9543	.9539	.9535
173	.9567	.9563	.9559	.9555	.9552	.9549	.9544	.9540	.9535	.9531
174	.9563	.9559	.9555	.9551	.9548	.9545	.9540	.9536	.9531	.9527
175	.9559	.9555	.9551	.9547	.9544	.9541	.9536	.9532	.9527	.9523
176	.9555	.9551	.9547	.9543	.9540	.9537	.9532	.9528	.9523	.9519
177	.9551	.9547	.9543	.9539	.9536	.9533	.9528	.9524	.9519	.9515
178	.9548	.9544	.9540	.9536	.9533	.9529	.9524	.9519	.9514	.9510
179	.9544	.9540	.9536	.9532	.9529	.9525	.9520	.9515	.9510	.9506
180	.9540	.9536	.9532	.9528	.9525	.9521	.9516	.9511	.9506	.9502
181	.9536	.9532	.9528	.9524	.9521	.9517	.9512	.9507	.9502	.9498
182	.9533	.9529	.9524	.9520	.9517	.9513	.9508	.9503	.9498	.9494
183	.9529	.9525	.9521	.9517	.9514	.9510	.9505	.9499	.9494	.9490
184	.9526	.9522	.9517	.9513	.9510	.9506	.9501	.9495	.9490	.9486
185	.9522	.9518	.9513	.9509	.9506	.9502	.9497	.9491	.9486	.9482
186	.9518	.9514	.9509	.9505	.9502	.9498	.9493	.9487	.9482	.9478
187	.9514	.9510	.9505	.9501	.9498	.9494	.9489	.9483	.9478	.9474
188	.9511	.9507	.9502	.9498	.9494	.9490	.9485	.9479	.9474	.9469
189	.9507	.9503	.9498	.9494	.9490	.9486	.9481	.9475	.9470	.9465
190	.9503	.9499	.9494	.9490	.9486	.9482	.9477	.9471	.9466	.9461
191	.9499	.9495	.9490	.9486	.9482	.9478	.9473	.9467	.9462	.9457
192	.9496	.9491	.9487	.9482	.9478	.9474	.9469	.9463	.9458	.9453
193	.9492	.9488	.9483	.9479	.9475	.9471	.9465	.9460	.9454	.9449
194	.9489	.9484	.9480	.9475	.9471	.9467	.9461	.9456	.9450	.9445
195	.9485	.9480	.9476	.9471	.9467	.9463	.9457	.9452	.9446	.9441











Observed  
tempera-  
ture in  
°F

30 31 32 33 34 35 36 37 38 39

Volume at 60° F occupied by unit volume at indicated temperature

65	0.9979	0.9979	0.9978	0.9978	0.9978	0.9978	0.9978	0.9977	0.9977	0.9977
66	.9975	.9975	.9974	.9974	.9974	.9973	.9973	.9972	.9972	.9972
67	.9971	.9970	.9970	.9969	.9969	.9969	.9969	.9968	.9968	.9968
68	.9966	.9966	.9965	.9965	.9965	.9964	.9964	.9963	.9963	.9963
69	.9962	.9961	.9961	.9960	.9960	.9960	.9960	.9959	.9959	.9959
70	.9958	.9957	.9957	.9956	.9956	.9955	.9955	.9954	.9954	.9954
71	.9954	.9953	.9953	.9952	.9952	.9951	.9950	.9950	.9949	.9949
72	.9950	.9949	.9949	.9948	.9947	.9946	.9946	.9945	.9945	.9945
73	.9945	.9944	.9944	.9943	.9943	.9942	.9941	.9941	.9940	.9940
74	.9941	.9940	.9940	.9939	.9938	.9937	.9937	.9936	.9936	.9935
75	.9937	.9936	.9936	.9935	.9934	.9933	.9932	.9932	.9931	.9930
76	.9933	.9932	.9932	.9931	.9930	.9929	.9928	.9928	.9926	.9925
77	.9928	.9927	.9927	.9926	.9925	.9924	.9923	.9923	.9922	.9921
78	.9924	.9923	.9923	.9922	.9921	.9920	.9919	.9918	.9917	.9916
79	.9919	.9918	.9918	.9917	.9916	.9915	.9914	.9914	.9913	.9912
80	.9915	.9914	.9914	.9913	.9912	.9911	.9910	.9909	.9908	.9907
81	.9911	.9910	.9910	.9909	.9908	.9906	.9905	.9904	.9903	.9902
82	.9907	.9906	.9905	.9904	.9903	.9902	.9901	.9899	.9898	.9897
83	.9902	.9901	.9901	.9900	.9899	.9897	.9896	.9895	.9894	.9893
84	.9898	.9897	.9896	.9895	.9894	.9893	.9892	.9890	.9889	.9888
85	.9894	.9893	.9892	.9891	.9890	.9888	.9887	.9885	.9884	.9883
86	.9890	.9889	.9888	.9887	.9886	.9884	.9882	.9881	.9879	.9878
87	.9886	.9885	.9883	.9882	.9881	.9879	.9878	.9876	.9875	.9874
88	.9881	.9880	.9879	.9878	.9877	.9875	.9873	.9872	.9870	.9869
89	.9877	.9876	.9874	.9873	.9872	.9870	.9869	.9867	.9866	.9865
90	.9873	.9872	.9870	.9869	.9868	.9866	.9864	.9863	.9861	.9860
91	.9869	.9868	.9866	.9865	.9864	.9862	.9860	.9858	.9856	.9855
92	.9865	.9863	.9862	.9860	.9859	.9857	.9855	.9854	.9852	.9850
93	.9860	.9859	.9857	.9856	.9855	.9853	.9851	.9849	.9847	.9846
94	.9856	.9854	.9853	.9851	.9850	.9849	.9847	.9845	.9843	.9841
95	.9852	.9850	.9849	.9847	.9846	.9844	.9842	.9840	.9838	.9836
96	.9848	.9846	.9845	.9843	.9842	.9840	.9838	.9835	.9833	.9831
97	.9844	.9842	.9841	.9839	.9837	.9835	.9833	.9831	.9829	.9827
98	.9839	.9837	.9836	.9834	.9833	.9831	.9829	.9826	.9824	.9822
99	.9835	.9833	.9832	.9830	.9828	.9826	.9824	.9822	.9820	.9818
100	.9831	.9829	.9828	.9826	.9824	.9822	.9820	.9817	.9815	.9813
101	.9827	.9825	.9824	.9822	.9820	.9818	.9815	.9813	.9810	.9808
102	.9823	.9821	.9819	.9817	.9815	.9813	.9811	.9808	.9806	.9804
103	.9818	.9816	.9815	.9813	.9811	.9809	.9806	.9804	.9801	.9799
104	.9814	.9812	.9810	.9808	.9806	.9804	.9802	.9799	.9797	.9795
105	.9810	.9808	.9806	.9804	.9802	.9800	.9797	.9795	.9792	.9790
106	.9806	.9804	.9802	.9800	.9798	.9795	.9792	.9790	.9787	.9785
107	.9802	.9800	.9797	.9795	.9793	.9791	.9788	.9786	.9783	.9780
108	.9797	.9795	.9793	.9791	.9789	.9786	.9783	.9781	.9778	.9776
109	.9793	.9791	.9788	.9786	.9784	.9782	.9779	.9777	.9774	.9771
110	.9789	.9787	.9784	.9782	.9780	.9777	.9774	.9772	.9769	.9766
111	.9785	.9783	.9780	.9778	.9776	.9773	.9770	.9767	.9764	.9761
112	.9781	.9779	.9776	.9774	.9771	.9768	.9765	.9763	.9760	.9757
113	.9776	.9774	.9771	.9769	.9767	.9764	.9761	.9758	.9755	.9752
114	.9772	.9770	.9767	.9765	.9762	.9759	.9756	.9754	.9751	.9748
115	.9768	.9766	.9763	.9761	.9758	.9755	.9752	.9749	.9746	.9743
116	.9764	.9762	.9759	.9757	.9754	.9751	.9748	.9744	.9741	.9738
117	.9760	.9757	.9755	.9752	.9749	.9746	.9743	.9740	.9737	.9734
118	.9755	.9753	.9750	.9748	.9745	.9742	.9739	.9735	.9732	.9729
119	.9751	.9748	.9746	.9743	.9740	.9737	.9734	.9731	.9728	.9725
120	.9747	.9744	.9742	.9739	.9736	.9733	.9730	.9726	.9723	.9720
121	.9743	.9740	.9738	.9735	.9732	.9729	.9725	.9722	.9718	.9715
122	.9739	.9736	.9733	.9730	.9727	.9724	.9721	.9717	.9714	.9710
123	.9734	.9731	.9729	.9726	.9723	.9720	.9716	.9713	.9709	.9706
124	.9730	.9727	.9724	.9721	.9718	.9715	.9712	.9708	.9705	.9701
125	.9726	.9723	.9720	.9717	.9714	.9711	.9707	.9704	.9700	.9696
126	.9722	.9719	.9716	.9713	.9710	.9707	.9703	.9699	.9695	.9691
127	.9718	.9715	.9712	.9709	.9706	.9702	.9698	.9695	.9691	.9687
128	.9713	.9710	.9707	.9704	.9701	.9698	.9694	.9690	.9686	.9682
129	.9709	.9706	.9703	.9700	.9697	.9693	.9689	.9686	.9682	.9678





Observed tempera- ture in °F	Degrees A.P.I. at 60°F										9.
	30	31	32	33	34	35	36	37	38	39	
	Volume at 60°F occupied by unit volume at indicated temperature										
130	0.9705	0.9702	0.9699	0.9696	0.9693	0.9689	0.9685	0.9681	0.9677	0.9673	
131	.9701	.9698	.9695	.9692	.9689	.9685	.9681	.9676	.9672	.9668	
132	.9697	.9694	.9690	.9687	.9684	.9680	.9676	.9672	.9668	.9664	
133	.9692	.9689	.9686	.9683	.9680	.9676	.9672	.9667	.9663	.9659	
134	.9688	.9685	.9681	.9678	.9675	.9671	.9667	.9663	.9659	.9655	
135	.9684	.9681	.9677	.9674	.9671	.9667	.9663	.9658	.9654	.9650	
136	.9680	.9677	.9673	.9670	.9667	.9663	.9658	.9654	.9649	.9645	
137	.9676	.9673	.9669	.9666	.9662	.9658	.9654	.9649	.9645	.9641	
138	.9672	.9668	.9665	.9661	.9658	.9654	.9649	.9645	.9640	.9636	
139	.9668	.9664	.9661	.9657	.9653	.9649	.9645	.9640	.9636	.9632	
140	.9664	.9660	.9657	.9653	.9649	.9645	.9640	.9636	.9631	.9627	
141	.9660	.9656	.9653	.9649	.9645	.9641	.9636	.9631	.9626	.9622	
142	.9656	.9652	.9648	.9644	.9640	.9636	.9631	.9627	.9622	.9617	
143	.9651	.9647	.9644	.9640	.9636	.9632	.9627	.9622	.9617	.9613	
144	.9647	.9643	.9639	.9635	.9631	.9627	.9622	.9618	.9613	.9608	
145	.9643	.9639	.9635	.9631	.9627	.9623	.9618	.9613	.9608	.9603	
146	.9639	.9635	.9631	.9627	.9623	.9619	.9614	.9608	.9603	.9598	
147	.9635	.9631	.9627	.9623	.9619	.9614	.9609	.9604	.9599	.9594	
148	.9630	.9626	.9622	.9618	.9614	.9610	.9605	.9599	.9594	.9589	
149	.9626	.9622	.9618	.9614	.9610	.9605	.9600	.9595	.9590	.9585	
150	.9622	.9618	.9614	.9610	.9606	.9601	.9596	.9590	.9585	.9580	
151	.9618	.9614	.9610	.9606	.9602	.9597	.9591	.9586	.9580	.9575	
152	.9614	.9610	.9605	.9601	.9597	.9592	.9587	.9581	.9576	.9571	
153	.9609	.9605	.9601	.9597	.9593	.9588	.9582	.9577	.9571	.9566	
154	.9605	.9601	.9596	.9592	.9588	.9583	.9578	.9572	.9567	.9562	
155	.9601	.9597	.9592	.9588	.9584	.9579	.9573	.9568	.9562	.9557	
156	.9597	.9593	.9589	.9584	.9580	.9575	.9569	.9563	.9557	.9552	
157	.9593	.9588	.9584	.9579	.9575	.9570	.9564	.9559	.9553	.9547	
158	.9588	.9584	.9579	.9575	.9571	.9566	.9560	.9554	.9548	.9543	
159	.9584	.9579	.9575	.9570	.9566	.9561	.9555	.9550	.9544	.9538	
160	.9580	.9575	.9571	.9566	.9562	.9557	.9551	.9545	.9539	.9533	
161	.9576	.9571	.9567	.9562	.9558	.9553	.9547	.9540	.9534	.9528	
162	.9572	.9567	.9563	.9558	.9553	.9548	.9542	.9536	.9530	.9524	
163	.9568	.9563	.9558	.9553	.9549	.9544	.9538	.9531	.9525	.9519	
164	.9564	.9559	.9554	.9549	.9544	.9539	.9533	.9527	.9521	.9515	
165	.9560	.9555	.9550	.9545	.9540	.9535	.9529	.9522	.9516	.9510	
166	.9556	.9551	.9546	.9541	.9536	.9531	.9525	.9518	.9512	.9506	
167	.9552	.9547	.9542	.9537	.9532	.9526	.9520	.9513	.9507	.9501	
168	.9547	.9542	.9537	.9532	.9527	.9522	.9516	.9509	.9503	.9497	
169	.9543	.9538	.9533	.9528	.9523	.9517	.9511	.9504	.9498	.9492	
170	.9539	.9534	.9529	.9524	.9519	.9513	.9507	.9500	.9494	.9488	
171	.9535	.9530	.9525	.9520	.9515	.9509	.9502	.9496	.9489	.9483	
172	.9531	.9526	.9520	.9515	.9510	.9504	.9498	.9491	.9485	.9478	
173	.9526	.9521	.9516	.9511	.9506	.9500	.9493	.9487	.9480	.9474	
174	.9522	.9517	.9511	.9506	.9501	.9495	.9489	.9482	.9476	.9469	
175	.9518	.9513	.9507	.9502	.9497	.9491	.9484	.9478	.9471	.9464	
176	.9514	.9509	.9503	.9498	.9493	.9487	.9480	.9473	.9466	.9459	
177	.9510	.9505	.9499	.9494	.9488	.9482	.9475	.9469	.9462	.9455	
178	.9505	.9500	.9494	.9489	.9484	.9478	.9471	.9464	.9457	.9450	
179	.9501	.9496	.9490	.9485	.9479	.9473	.9466	.9460	.9453	.9446	
180	.9497	.9492	.9486	.9481	.9475	.9469	.9462	.9455	.9448	.9441	
181	.9493	.9488	.9482	.9477	.9471	.9465	.9458	.9450	.9443	.9436	
182	.9489	.9484	.9478	.9473	.9467	.9460	.9453	.9446	.9439	.9432	
183	.9485	.9479	.9474	.9468	.9462	.9456	.9449	.9441	.9434	.9427	
184	.9481	.9475	.9470	.9464	.9458	.9451	.9444	.9437	.9430	.9423	
185	.9477	.9471	.9466	.9460	.9454	.9447	.9440	.9432	.9425	.9418	
186	.9473	.9467	.9462	.9456	.9450	.9443	.9435	.9428	.9420	.9413	
187	.9469	.9463	.9457	.9451	.9445	.9438	.9431	.9423	.9416	.9409	
188	.9464	.9458	.9453	.9447	.9441	.9434	.9426	.9419	.9411	.9404	
189	.9460	.9454	.9448	.9442	.9436	.9429	.9422	.9414	.9407	.9400	
190	.9456	.9450	.9444	.9438	.9432	.9425	.9417	.9410	.9402	.9395	
191	.9452	.9446	.9440	.9434	.9428	.9421	.9413	.9405	.9397	.9390	
192	.9448	.9442	.9436	.9430	.9423	.9416	.9408	.9401	.9393	.9385	
193	.9444	.9438	.9431	.9425	.9419	.9412	.9404	.9396	.9388	.9381	
194	.9440	.9434	.9427	.9421	.9414	.9407	.9399	.9392	.9384	.9377	
195	.9436	.9430	.9423	.9417	.9410	.9403	.9395				





Degrees A.P.I. at 60°F

Observed tempera- ture in of	40	41	42	43	44	45	46	47	48	49
	Volume at 60°F occupied by unit volume at indicated temperature									
0	1.0284	1.0287	1.0291	1.0294	1.0297	1.0301	1.0305	1.0310	1.0315	1.0319
1	1.0279	1.0282	1.0286	1.0289	1.0292	1.0296	1.0300	1.0305	1.0310	1.0314
2	1.0275	1.0278	1.0281	1.0284	1.0287	1.0291	1.0295	1.0300	1.0305	1.0309
3	1.0270	1.0273	1.0177	1.0280	1.0283	1.0286	1.0290	1.0294	1.0299	1.0303
4	1.0266	1.0269	1.0272	1.0275	1.0278	1.0281	1.0285	1.0289	1.0294	1.0298
5	1.0261	1.0264	1.0267	1.0270	1.0273	1.0276	1.0280	1.0284	1.0289	1.0293
6	1.0256	1.0259	1.0262	1.0265	1.0268	1.0271	1.0275	1.0279	1.0284	1.0288
7	1.0251	1.0254	1.0257	1.0260	1.0263	1.0266	1.0270	1.0274	1.0279	1.0282
8	1.0247	1.0250	1.0252	1.0255	1.0258	1.0261	1.0265	1.0269	1.0273	1.0277
9	1.0242	1.0245	1.0247	1.0250	1.0253	1.0256	1.0260	1.0264	1.0268	1.0271
10	1.0237	1.0240	1.0242	1.0245	1.0248	1.0251	1.0255	1.0259	1.0263	1.0266
11	1.0232	1.0235	1.0237	1.0240	1.0243	1.0246	1.0250	1.0254	1.0258	1.0261
12	1.0227	1.0230	1.0232	1.0235	1.0238	1.0241	1.0245	1.0249	1.0253	1.0256
13	1.0223	1.0226	1.0228	1.0231	1.0233	1.0236	1.0240	1.0243	1.0247	1.0250
14	1.0218	1.0221	1.0223	1.0226	1.0228	1.0231	1.0235	1.0238	1.0242	1.0245
15	1.0213	1.0216	1.0218	1.0221	1.0223	1.0226	1.0230	1.0233	1.0237	1.0240
16	1.0208	1.0211	1.0213	1.0216	1.0218	1.0221	1.0225	1.0228	1.0232	1.0235
17	1.0203	1.0206	1.0208	1.0211	1.0213	1.0216	1.0219	1.0223	1.0226	1.0229
18	1.0199	1.0201	1.0204	1.0206	1.0208	1.0211	1.0214	1.0218	1.0221	1.0224
19	1.0194	1.0196	1.0199	1.0201	1.0203	1.0206	1.0209	1.0212	1.0215	1.0218
20	1.0189	1.0191	1.0194	1.0196	1.0198	1.0201	1.0204	1.0207	1.0210	1.0213
21	1.0184	1.0186	1.0189	1.0191	1.0193	1.0196	1.0199	1.0202	1.0205	1.0208
22	1.0180	1.0182	1.0184	1.0186	1.0188	1.0191	1.0194	1.0197	1.0200	1.0202
23	1.0175	1.0177	1.0180	1.0182	1.0184	1.0186	1.0189	1.0191	1.0194	1.0197
24	1.0171	1.0173	1.0175	1.0177	1.0179	1.0181	1.0184	1.0186	1.0189	1.0191
25	1.0166	1.0168	1.0170	1.0172	1.0174	1.0176	1.0179	1.0181	1.0184	1.0186
26	1.0161	1.0163	1.0165	1.0167	1.0169	1.0171	1.0174	1.0176	1.0179	1.0181
27	1.0156	1.0158	1.0160	1.0162	1.0164	1.0166	1.0169	1.0171	1.0174	1.0176
28	1.0152	1.0154	1.0155	1.0157	1.0159	1.0161	1.0163	1.0166	1.0168	1.0170
29	1.0147	1.0149	1.0150	1.0152	1.0154	1.0156	1.0158	1.0161	1.0163	1.0165
30	1.0142	1.0144	1.0145	1.0147	1.0149	1.0151	1.0153	1.0156	1.0158	1.0160
31	1.0137	1.0139	1.0140	1.0142	1.0144	1.0146	1.0148	1.0151	1.0153	1.0155
32	1.0133	1.0134	1.0136	1.0137	1.0139	1.0141	1.0143	1.0146	1.0148	1.0149
33	1.0128	1.0130	1.0131	1.0133	1.0134	1.0136	1.0138	1.0140	1.0142	1.0144
34	1.0124	1.0125	1.0127	1.0128	1.0129	1.0131	1.0133	1.0135	1.0137	1.0138
35	1.0119	1.0120	1.0122	1.0123	1.0124	1.0126	1.0128	1.0130	1.0132	1.0133
36	1.0114	1.0115	1.0117	1.0118	1.0119	1.0121	1.0123	1.0125	1.0127	1.0126
37	1.0109	1.0110	1.0112	1.0113	1.0114	1.0116	1.0118	1.0119	1.0121	1.0122
38	1.0105	1.0106	1.0107	1.0108	1.0109	1.0110	1.0112	1.0114	1.0116	1.0117
39	1.0100	1.0101	1.0102	1.0103	1.0104	1.0105	1.0107	1.0108	1.0110	1.0111
40	1.0095	1.0096	1.0097	1.0098	1.0099	1.0100	1.0102	1.0103	1.0105	1.0106
41	1.0090	1.0091	1.0092	1.0093	1.0094	1.0095	1.0097	1.0098	1.0100	1.0101
42	1.0085	1.0086	1.0087	1.0088	1.0089	1.0090	1.0092	1.0093	1.0095	1.0096
43	1.0081	1.0082	1.0083	1.0084	1.0084	1.0085	1.0086	1.0088	1.0089	1.0090
44	1.0076	1.0077	1.0078	1.0079	1.0079	1.0080	1.0081	1.0083	1.0084	1.0085
45	1.0071	1.0072	1.0073	1.0074	1.0074	1.0075	1.0076	1.0078	1.0079	1.0080
46	1.0066	1.0067	1.0068	1.0069	1.0069	1.0070	1.0071	1.0073	1.0074	1.0075
47	1.0061	1.0062	1.0063	1.0064	1.0064	1.0065	1.0066	1.0068	1.0069	1.0069
48	1.0057	1.0058	1.0058	1.0059	1.0059	1.0060	1.0061	1.0062	1.0063	1.0064
49	1.0052	1.0053	1.0053	1.0054	1.0054	1.0055	1.0056	1.0057	1.0058	1.0058





## Degrees A.P.I. at 60°F

Observed  
tempera-  
ture in  
°F40 41 42 43 44 45 46 47 48 49  
Volume at 60°F occupied by unit volume at indicated temperature.

50	1.0047	1.0048	1.0048	1.0049	1.0049	1.0050	1.0051	1.0052	1.0053	1.0053
51	1.0042	1.0043	1.0043	1.0044	1.0044	1.0045	1.0046	1.0047	1.0048	1.0048
52	1.0038	1.0038	1.0039	1.0039	1.0039	1.0040	1.0041	1.0041	1.0042	1.0042
53	1.0033	1.0034	1.0034	1.0035	1.0035	1.0035	1.0036	1.0036	1.0037	1.0037
54	1.0029	1.0029	1.0030	1.0030	1.0030	1.0030	1.0030	1.0031	1.0031	1.0031
55	1.0024	1.0024	1.0025	1.0025	1.0025	1.0025	1.0025	1.0026	1.0026	1.0026
56	1.0019	1.0019	1.0020	1.0020	1.0020	1.0020	1.0020	1.0021	1.0021	1.0021
57	1.0014	1.0014	1.0015	1.0015	1.0015	1.0015	1.0015	1.0016	1.0016	1.0016
58	1.0010	1.0010	1.0010	1.0010	1.0010	1.0010	1.0010	1.0010	1.0010	1.0010
59	1.0005	1.0005	1.0005	1.0005	1.0005	1.0005	1.0005	1.0005	1.0005	1.0005
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
61	0.9995	0.9995	0.9995	0.9995	0.9995	0.9995	0.9995	0.9995	0.9995	0.9995
62	.9990	.9990	.9990	.9990	.9990	.9990	.9990	.9990	.9990	.9990
63	.9986	.9986	.9985	.9985	.9985	.9985	.9985	.9984	.9984	.9984
64	.9981	.9981	.9980	.9980	.9980	.9980	.9980	.9979	.9979	.9979
65	.9976	.9976	.9975	.9975	.9975	.9975	.9975	.9974	.9974	.9974
66	.9971	.9971	.9970	.9970	.9970	.9970	.9970	.9969	.9969	.9969
67	.9967	.9966	.9966	.9965	.9965	.9965	.9964	.9964	.9963	.9963
68	.9962	.9962	.9961	.9961	.9961	.9960	.9959	.9959	.9958	.9958
69	.9958	.9957	.9957	.9956	.9956	.9955	.9954	.9953	.9952	.9952
70	.9953	.9952	.9952	.9951	.9951	.9950	.9949	.9948	.9947	.9947
71	.9948	.9947	.9947	.9946	.9946	.9945	.9944	.9943	.9942	.9942
72	.9943	.9942	.9942	.9941	.9941	.9940	.9939	.9938	.9937	.9936
73	.9939	.9938	.9937	.9936	.9935	.9934	.9933	.9932	.9931	.9931
74	.9934	.9933	.9932	.9931	.9930	.9929	.9928	.9927	.9926	.9925
75	.9929	.9928	.9927	.9926	.9925	.9924	.9923	.9922	.9921	.9920
76	.9924	.9923	.9922	.9921	.9920	.9919	.9918	.9917	.9916	.9915
77	.9919	.9918	.9917	.9916	.9915	.9914	.9913	.9911	.9910	.9909
78	.9915	.9914	.9913	.9912	.9911	.9909	.9908	.9906	.9905	.9904
79	.9910	.9909	.9908	.9907	.9906	.9904	.9902	.9901	.9899	.9898
80	.9905	.9904	.9903	.9902	.9901	.9899	.9897	.9896	.9894	.9893
81	.9900	.9899	.9898	.9897	.9896	.9894	.9892	.9891	.9889	.9888
82	.9895	.9894	.9893	.9892	.9891	.9889	.9887	.9886	.9884	.9882
83	.9891	.9890	.9888	.9887	.9886	.9884	.9882	.9880	.9878	.9877
84	.9886	.9885	.9883	.9882	.9881	.9879	.9877	.9875	.9873	.9871
85	.9881	.9880	.9878	.9877	.9876	.9874	.9872	.9870	.9868	.9866
86	.9876	.9875	.9873	.9872	.9871	.9869	.9867	.9865	.9863	.9861
87	.9872	.9870	.9869	.9867	.9866	.9864	.9862	.9860	.9858	.9856
88	.9867	.9866	.9864	.9863	.9861	.9859	.9857	.9854	.9852	.9850
89	.9863	.9861	.9860	.9858	.9856	.9854	.9852	.9849	.9847	.9845
90	.9858	.9856	.9855	.9853	.9851	.9849	.9847	.9844	.9842	.9840
91	.9853	.9851	.9850	.9848	.9846	.9844	.9842	.9839	.9837	.9835
92	.9848	.9846	.9845	.9843	.9841	.9839	.9836	.9834	.9831	.9829
93	.9844	.9842	.9840	.9838	.9836	.9834	.9831	.9829	.9826	.9824
94	.9839	.9837	.9835	.9833	.9831	.9829	.9826	.9823	.9820	.9818
95	.9834	.9832	.9830	.9828	.9826	.9824	.9821	.9818	.9815	.9813
96	.9829	.9827	.9825	.9823	.9821	.9819	.9816	.9813	.9810	.9808
97	.9825	.9823	.9820	.9818	.9816	.9814	.9811	.9808	.9805	.9802
98	.9820	.9818	.9816	.9814	.9812	.9809	.9806	.9802	.9799	.9797
99	.9816	.9814	.9811	.9809	.9807	.9804	.9801	.9797	.9794	.9791



## Degrees A.P.I. at 60°F

Observed  
tempera-  
ture in  
°F

40 41 42 43 44 45 46 47 48 49

Volume at 60°F occupied by unit volume at indicated temperature

100	0.9811	0.9809	0.9806	0.9804	0.9802	0.9799	0.9796	0.9792	0.9789	0.9786
101	.9806	.9804	.9801	.9799	.9797	.9794	.9791	.9787	.9784	.9781
102	.9801	.9799	.9796	.9794	.9792	.9789	.9785	.9782	.9778	.9775
103	.9797	.9794	.9792	.9789	.9786	.9783	.9780	.9776	.9773	.9770
104	.9792	.9789	.9787	.9784	.9781	.9778	.9774	.9771	.9767	.9764
105	.9787	.9784	.9782	.9779	.9776	.9773	.9769	.9766	.9762	.9759
106	.9782	.9779	.9777	.9774	.9771	.9768	.9764	.9761	.9757	.9754
107	.9777	.9774	.9772	.9769	.9766	.9763	.9759	.9756	.9752	.9749
108	.9773	.9770	.9768	.9765	.9762	.9758	.9754	.9750	.9746	.9743
109	.9768	.9765	.9763	.9760	.9757	.9753	.9749	.9745	.9741	.9738
110	.9763	.9760	.9758	.9755	.9752	.9748	.9744	.9740	.9736	.9733
111	.9758	.9755	.9753	.9750	.9747	.9743	.9739	.9735	.9731	.9728
112	.9753	.9750	.9748	.9745	.9742	.9738	.9734	.9730	.9726	.9722
113	.9749	.9746	.9743	.9740	.9737	.9733	.9729	.9724	.9720	.9717
114	.9744	.9741	.9738	.9735	.9732	.9728	.9724	.9719	.9715	.9711
115	.9739	.9736	.9733	.9730	.9727	.9723	.9719	.9714	.9710	.9706
116	.9734	.9731	.9728	.9725	.9722	.9718	.9714	.9709	.9705	.9701
117	.9730	.9727	.9723	.9720	.9717	.9713	.9708	.9704	.9699	.9695
118	.9725	.9722	.9719	.9716	.9712	.9708	.9703	.9699	.9694	.9690
119	.9721	.9718	.9714	.9711	.9707	.9703	.9698	.9693	.9688	.9684
120	.9716	.9713	.9709	.9706	.9702	.9698	.9693	.9688	.9683	.9679
121	.9711	.9708	.9704	.9701	.9697	.9693	.9688	.9683	.9678	.9674
122	.9706	.9703	.9699	.9696	.9692	.9688	.9683	.9678	.9673	.9668
123	.9702	.9698	.9695	.9691	.9687	.9683	.9678	.9672	.9667	.9663
124	.9697	.9693	.9690	.9686	.9682	.9678	.9673	.9667	.9662	.9657
125	.9692	.9688	.9685	.9681	.9677	.9673	.9668	.9662	.9657	.9652
126	.9687	.9683	.9680	.9676	.9672	.9668	.9663	.9657	.9652	.9647
127	.9683	.9679	.9675	.9671	.9667	.9663	.9658	.9652	.9647	.9642
128	.9678	.9674	.9671	.9667	.9662	.9657	.9652	.9647	.9641	.9636
129	.9674	.9670	.9666	.9662	.9657	.9652	.9647	.9642	.9636	.9631
130	.9669	.9665	.9661	.9657	.9652	.9647	.9642	.9637	.9631	.9626
131	.9664	.9660	.9656	.9652	.9647	.9642	.9637	.9632	.9626	.9621
132	.9659	.9655	.9651	.9647	.9642	.9637	.9632	.9626	.9620	.9615
133	.9655	.9651	.9646	.9642	.9637	.9632	.9626	.9621	.9615	.9610
134	.9650	.9646	.9641	.9637	.9632	.9627	.9621	.9615	.9609	.9604
135	.9645	.9641	.9636	.9632	.9627	.9622	.9616	.9610	.9604	.9599
136	.9640	.9636	.9631	.9627	.9622	.9617	.9611	.9605	.9599	.9594
137	.9636	.9631	.9627	.9622	.9617	.9612	.9606	.9600	.9594	.9588
138	.9631	.9627	.9622	.9618	.9613	.9607	.9601	.9594	.9588	.9583
139	.9627	.9622	.9618	.9613	.9608	.9602	.9596	.9589	.9583	.9577
140	.9622	.9617	.9613	.9608	.9603	.9597	.9591	.9584	.9578	.9572
141	.9617	.9612	.9608	.9603	.9598	.9592	.9586	.9579	.9573	.9567
142	.9612	.9607	.9603	.9598	.9593	.9587	.9580	.9574	.9567	.9561
143	.9608	.9603	.9598	.9593	.9588	.9582	.9575	.9569	.9562	.9556
144	.9603	.9598	.9593	.9588	.9583	.9577	.9570	.9563	.9556	.9550
145	.9598	.9593	.9588	.9583	.9578	.9572	.9565	.9558	.9551	.9545
146	.9593	.9588	.9583	.9578	.9573	.9567	.9560	.9553	.9546	.9540
147	.9588	.9583	.9578	.9573	.9568	.9562	.9555	.9548	.9541	.9534
148	.9584	.9579	.9574	.9569	.9563	.9557	.9550	.9542	.9535	.9529
149	.9579	.9574	.9569	.9564	.9558	.9552	.9545	.9537	.9530	.9523
150	.9574	.9569	.9564	.9559	.9553	.9547	.9540	.9532	.9525	.9518





Observed  
tempera-  
ture in  
°F

50 51 52 53 54 55 56 57 58 59

Volume at 60°F occupied by unit volume at indicated temperature.

0	1.0324	1.0328	1.0333	1.0337	1.0342	1.0347	1.0352	1.0356	1.0361	1.0365
1	1.0319	1.0323	1.0328	1.0332	1.0336	1.0341	1.0346	1.0350	1.0355	1.0359
2	1.0313	1.0317	1.0322	1.0326	1.0331	1.0335	1.0340	1.0344	1.0349	1.0353
3	1.0308	1.0312	1.0317	1.0321	1.0325	1.0330	1.0335	1.0339	1.0343	1.0347
4	1.0302	1.0306	1.0311	1.0315	1.0320	1.0324	1.0329	1.0333	1.0337	1.0341
5	1.0297	1.0301	1.0306	1.0310	1.0314	1.0318	1.0323	1.0327	1.0331	1.0335
6	1.0292	1.0296	1.0300	1.0304	1.0308	1.0312	1.0317	1.0321	1.0325	1.0329
7	1.0286	1.0290	1.0295	1.0299	1.0303	1.0307	1.0311	1.0315	1.0319	1.0323
8	1.0281	1.0285	1.0289	1.0293	1.0297	1.0301	1.0306	1.0309	1.0313	1.0317
9	1.0275	1.0279	1.0284	1.0288	1.0292	1.0296	1.0300	1.0303	1.0307	1.0311
10	1.0270	1.0274	1.0278	1.0282	1.0286	1.0290	1.0294	1.0297	1.0301	1.0305
11	1.0265	1.0268	1.0272	1.0276	1.0280	1.0284	1.0288	1.0291	1.0295	1.0299
12	1.0259	1.0263	1.0267	1.0270	1.0274	1.0278	1.0282	1.0285	1.0289	1.0293
13	1.0254	1.0257	1.0261	1.0265	1.0269	1.0273	1.0277	1.0280	1.0283	1.0286
14	1.0248	1.0252	1.0256	1.0259	1.0263	1.0267	1.0271	1.0274	1.0277	1.0280
15	1.0243	1.0246	1.0250	1.0253	1.0257	1.0261	1.0265	1.0268	1.0271	1.0274
16	1.0238	1.0241	1.0245	1.0248	1.0251	1.0255	1.0259	1.0262	1.0265	1.0268
17	1.0232	1.0235	1.0239	1.0242	1.0246	1.0249	1.0253	1.0256	1.0259	1.0262
18	1.0227	1.0230	1.0234	1.0237	1.0240	1.0244	1.0248	1.0250	1.0253	1.0256
19	1.0221	1.0224	1.0228	1.0231	1.0235	1.0238	1.0242	1.0244	1.0247	1.0250
20	1.0216	1.0219	1.0223	1.0226	1.0229	1.0232	1.0236	1.0238	1.0241	1.0244
21	1.0211	1.0214	1.0217	1.0220	1.0223	1.0226	1.0230	1.0232	1.0235	1.0238
22	1.0205	1.0208	1.0212	1.0214	1.0217	1.0220	1.0224	1.0226	1.0229	1.0232
23	1.0200	1.0203	1.0206	1.0209	1.0212	1.0215	1.0218	1.0220	1.0223	1.0226
24	1.0194	1.0197	1.0201	1.0203	1.0206	1.0209	1.0212	1.0214	1.0217	1.0220
25	1.0189	1.0192	1.0195	1.0197	1.0200	1.0203	1.0206	1.0208	1.0211	1.0214
26	1.0184	1.0186	1.0189	1.0191	1.0194	1.0197	1.0200	1.0202	1.0205	1.0208
27	1.0178	1.0181	1.0184	1.0186	1.0189	1.0191	1.0194	1.0196	1.0199	1.0202
28	1.0173	1.0175	1.0178	1.0180	1.0183	1.0186	1.0189	1.0191	1.0193	1.0195
29	1.0167	1.0170	1.0173	1.0175	1.0178	1.0180	1.0183	1.0185	1.0187	1.0189
30	1.0162	1.0164	1.0167	1.0169	1.0172	1.0174	1.0177	1.0179	1.0181	1.0183
31	1.0157	1.0159	1.0161	1.0163	1.0166	1.0168	1.0171	1.0173	1.0175	1.0177
32	1.0151	1.0153	1.0156	1.0158	1.0160	1.0162	1.0165	1.0167	1.0169	1.0171
33	1.0146	1.0148	1.0150	1.0152	1.0155	1.0157	1.0159	1.0161	1.0163	1.0165
34	1.0140	1.0142	1.0145	1.0147	1.0149	1.0151	1.0153	1.0155	1.0157	1.0159
35	1.0135	1.0137	1.0139	1.0141	1.0143	1.0145	1.0147	1.0149	1.0151	1.0153
36	1.0130	1.0132	1.0134	1.0135	1.0137	1.0139	1.0141	1.0143	1.0145	1.0147
37	1.0124	1.0126	1.0128	1.0130	1.0132	1.0133	1.0135	1.0137	1.0139	1.0141
38	1.0119	1.0121	1.0123	1.0124	1.0126	1.0128	1.0130	1.0131	1.0133	1.0134
39	1.0113	1.0115	1.0117	1.0119	1.0121	1.0122	1.0124	1.0125	1.0127	1.0128
40	1.0108	1.0110	1.0112	1.0113	1.0115	1.0116	1.0118	1.0119	1.0121	1.0122
41	1.0103	1.0104	1.0106	1.0107	1.0109	1.0110	1.0112	1.0113	1.0115	1.0116
42	1.0097	1.0099	1.0101	1.0102	1.0103	1.0104	1.0106	1.0107	1.0109	1.0110
43	1.0092	1.0093	1.0095	1.0096	1.0098	1.0099	1.0101	1.0102	1.0103	1.0104
44	1.0086	1.0088	1.0090	1.0091	1.0092	1.0093	1.0095	1.0096	1.0097	1.0098
45	1.0081	1.0082	1.0084	1.0085	1.0086	1.0087	1.0089	1.0090	1.0091	1.0092
46	1.0076	1.0077	1.0078	1.0079	1.0080	1.0081	1.0083	1.0084	1.0085	1.0086
47	1.0070	1.0071	1.0073	1.0073	1.0074	1.0075	1.0077	1.0078	1.0079	1.0080
48	1.0065	1.0066	1.0067	1.0068	1.0069	1.0070	1.0071	1.0071	1.0072	1.0073
49	1.0059	1.0060	1.0062	1.0062	1.0063	1.0064	1.0065	1.0065	1.0066	1.0067
50	1.0054	1.0055	1.0056	1.0056	1.0057	1.0058	1.0059	1.0059	1.0060	1.0061
51	1.0049	1.0049	1.0050	1.0050	1.0051	1.0052	1.0053	1.0053	1.0054	1.0055
52	1.0043	1.0044	1.0045	1.0045	1.0046	1.0046	1.0047	1.0047	1.0048	1.0049
53	1.0038	1.0038	1.0039	1.0039	1.0040	1.0041	1.0042	1.0042	1.0042	1.0042
54	1.0032	1.0033	1.0034	1.0034	1.0035	1.0035	1.0036	1.0036	1.0036	1.0036
55	1.0027	1.0027	1.0028	1.0028	1.0029	1.0029	1.0030	1.0030	1.0030	1.0030
56	1.0022	1.0022	1.0022	1.0022	1.0023	1.0023	1.0024	1.0024	1.0024	1.0024
57	1.0016	1.0016	1.0017	1.0017	1.0017	1.0017	1.0018	1.0018	1.0018	1.0018
58	1.0011	1.0011	1.0011	1.0011	1.0012	1.0012	1.0012	1.0012	1.0012	1.0012
59	1.0005	1.0005	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
61	0.9995	0.9995	0.9994	0.9994	0.9994	0.9994	0.9994	0.9994	0.9994	0.9994
62	.9989	.9989	.9989	.9989	.9988	.9988	.9988	.9988	.9988	.9988
63	.9984	.9984	.9983	.9983	.9983	.9983	.9983	.9983	.9982	.9982
64	.9978	.9978	.9978	.9978	.9977	.9977	.9977	.9977	.9976	.9976





Degrees A. P, I. at 60°F

Observed  
tempera-  
ture in  
°F

50 51 52 53 54 55 56 57 58 59

Volume at 60°F occupied by unit volume at indicated temperature

65	0.9973	0.9973	0.9972	0.9972	0.9971	0.9971	0.9971	0.9971	0.9970	0.9970
66	.9968	.9967	.9966	.9966	.9965	.9965	.9965	.9965	.9964	.9964
67	.9962	.9962	.9961	.9961	.9960	.9960	.9959	.9958	.9957	.9957
68	.9957	.9956	.9955	.9955	.9954	.9954	.9953	.9952	.9951	.9951
69	.9951	.9951	.9950	.9950	.9949	.9948	.9947	.9946	.9945	.9945
70	.9946	.9945	.9944	.9944	.9943	.9942	.9941	.9940	.9939	.9939
71	.9941	.9940	.9938	.9938	.9937	.9936	.9935	.9934	.9933	.9933
72	.9935	.9934	.9933	.9932	.9931	.9930	.9929	.9928	.9927	.9927
73	.9930	.9929	.9927	.9927	.9926	.9925	.9923	.9922	.9921	.9920
74	.9924	.9923	.9922	.9921	.9920	.9919	.9917	.9916	.9915	.9914
75	.9919	.9918	.9916	.9915	.9914	.9913	.9911	.9910	.9909	.9908
76	.9913	.9912	.9910	.9909	.9908	.9907	.9905	.9904	.9903	.9902
77	.9908	.9907	.9905	.9904	.9902	.9901	.9899	.9898	.9897	.9896
78	.9902	.9901	.9899	.9898	.9897	.9896	.9894	.9893	.9891	.9890
79	.9897	.9896	.9894	.9893	.9891	.9890	.9888	.9887	.9885	.9884
80	.9891	.9890	.9888	.9887	.9885	.9884	.9882	.9881	.9879	.9878
81	.9886	.9884	.9882	.9881	.9879	.9878	.9876	.9875	.9873	.9872
82	.9880	.9879	.9877	.9875	.9873	.9871	.9870	.9869	.9867	.9865
83	.9875	.9873	.9871	.9870	.9868	.9866	.9864	.9862	.9860	.9859
84	.9869	.9868	.9866	.9864	.9862	.9860	.9858	.9856	.9854	.9852
85	.9864	.9862	.9860	.9858	.9856	.9854	.9852	.9850	.9848	.9846
86	.9859	.9857	.9854	.9852	.9850	.9848	.9846	.9844	.9842	.9840
87	.9853	.9851	.9849	.9847	.9845	.9843	.9840	.9838	.9836	.9834
88	.9848	.9846	.9843	.9841	.9839	.9837	.9834	.9832	.9830	.9828
89	.9842	.9840	.9838	.9836	.9834	.9831	.9828	.9826	.9824	.9822
90	.9837	.9835	.9832	.9830	.9828	.9825	.9822	.9820	.9818	.9816
91	.9832	.9829	.9826	.9824	.9822	.9819	.9816	.9814	.9812	.9810
92	.9826	.9824	.9821	.9819	.9816	.9813	.9810	.9808	.9806	.9804
93	.9821	.9818	.9815	.9813	.9811	.9808	.9805	.9803	.9800	.9797
94	.9815	.9813	.9810	.9808	.9805	.9802	.9799	.9797	.9794	.9791
95	.9810	.9807	.9804	.9802	.9799	.9796	.9793	.9791	.9788	.9785
96	.9805	.9802	.9798	.9796	.9793	.9790	.9787	.9785	.9782	.9779
97	.9799	.9796	.9793	.9790	.9787	.9784	.9781	.9779	.9776	.9773
98	.9794	.9791	.9787	.9785	.9782	.9779	.9775	.9772	.9769	.9766
99	.9788	.9785	.9782	.9779	.9776	.9773	.9769	.9766	.9763	.9760
100	.9783	.9780	.9776	.9773	.9770	.9767	.9763	.9760	.9757	.9754
101	.9778	.9774	.9770	.9767	.9764	.9761	.9757	.9754	.9751	.9748
102	.9772	.9769	.9765	.9762	.9758	.9755	.9751	.9748	.9745	.9742
103	.9767	.9763	.9759	.9756	.9753	.9749	.9745	.9742	.9738	.9735
104	.9761	.9758	.9754	.9751	.9747	.9743	.9739	.9736	.9732	.9729
105	.9756	.9752	.9748	.9745	.9741	.9737	.9733	.9730	.9726	.9723
106	.9751	.9747	.9742	.9739	.9735	.9731	.9727	.9724	.9720	.9717
107	.9745	.9741	.9737	.9733	.9729	.9725	.9721	.9718	.9714	.9711
108	.9740	.9736	.9731	.9728	.9724	.9720	.9715	.9712	.9708	.9705
109	.9734	.9730	.9726	.9722	.9718	.9714	.9709	.9706	.9702	.9699
110	.9729	.9725	.9720	.9716	.9712	.9708	.9703	.9700	.9696	.9693
111	.9724	.9720	.9715	.9711	.9706	.9702	.9697	.9694	.9690	.9687
112	.9718	.9714	.9709	.9705	.9701	.9696	.9691	.9688	.9684	.9680
113	.9713	.9709	.9704	.9700	.9695	.9690	.9686	.9682	.9678	.9674
114	.9707	.9703	.9698	.9694	.9690	.9685	.9680	.9676	.9672	.9668
115	.9702	.9698	.9693	.9689	.9684	.9679	.9674	.9670	.9666	.9662
116	.9696	.9692	.9687	.9683	.9678	.9673	.9668	.9664	.9660	.9656
117	.9691	.9687	.9682	.9677	.9672	.9667	.9662	.9658	.9654	.9650
118	.9685	.9681	.9676	.9672	.9667	.9662	.9656	.9652	.9647	.9643
119	.9680	.9676	.9671	.9666	.9661	.9656	.9650	.9646	.9641	.9637
120	.9674	.9670	.9665	.9660	.9655	.9650	.9644	.9640	.9635	.9631
121	.9669	.9664	.9659	.9654	.9649	.9644	.9638	.9634	.9629	.9625
122	.9663	.9659	.9654	.9649	.9643	.9638	.9632	.9628	.9623	.9619
123	.9658	.9653	.9648	.9643	.9638	.9632	.9626	.9622	.9617	.9612
124	.9652	.9648	.9643	.9638	.9632	.9626	.9620	.9616	.9611	.9606
125	.9647	.9642	.9637	.9632	.9626	.9620	.9614	.9610	.9605	.9600





Observed temperature in °F	60	61	62	63	64	65	66	67	68	69	70
	Volume at 60°F occupied by unit volume at indicated temperature										
0	1.0370	1.0374	1.0378	1.0382	1.0387	1.0391	1.0395	1.0399	1.0403	1.0407	1.0411
1	1.0364	1.0368	1.0372	1.0376	1.0381	1.0384	1.0388	1.0392	1.0396	1.0400	1.0404
2	1.0358	1.0362	1.0366	1.0370	1.0374	1.0378	1.0382	1.0385	1.0389	1.0393	1.0397
3	1.0351	1.0355	1.0359	1.0363	1.0368	1.0371	1.0375	1.0379	1.0383	1.0387	1.0391
4	1.0345	1.0349	1.0353	1.0357	1.0361	1.0365	1.0369	1.0372	1.0376	1.0380	1.0384
5	1.0339	1.0343	1.0347	1.0351	1.0355	1.0358	1.0362	1.0365	1.0369	1.0373	1.0377
6	1.0333	1.0337	1.0341	1.0345	1.0349	1.0342	1.0356	1.0359	1.0362	1.0366	1.0370
7	1.0327	1.0331	1.0335	1.0338	1.0342	1.0345	1.0349	1.0352	1.0356	1.0359	1.0363
8	1.0321	1.0324	1.0328	1.0332	1.0336	1.0339	1.0343	1.0346	1.0349	1.0353	1.0357
9	1.0315	1.0318	1.0322	1.0325	1.0329	1.0332	1.0336	1.0339	1.0343	1.0346	1.0350
10	1.0309	1.0312	1.0316	1.0319	1.0323	1.0326	1.0330	1.0333	1.0336	1.0339	1.0343
11	1.0303	1.0306	1.0310	1.0313	1.0317	1.0320	1.0323	1.0326	1.0329	1.0332	1.0336
12	1.0297	1.0300	1.0304	1.0307	1.0310	1.0313	1.0317	1.0320	1.0323	1.0326	1.0330
13	1.0290	1.0293	1.0297	1.0300	1.0304	1.0307	1.0310	1.0313	1.0316	1.0319	1.0323
14	1.0284	1.0287	1.0291	1.0294	1.0297	1.0300	1.0304	1.0307	1.0310	1.0313	1.0317
15	1.0278	1.0281	1.0285	1.0288	1.0291	1.0294	1.0297	1.0300	1.0303	1.0306	1.0310
16	1.0272	1.0275	1.0279	1.0282	1.0285	1.0287	1.0290	1.0293	1.0296	1.0299	1.0303
17	1.0266	1.0269	1.0272	1.0275	1.0278	1.0281	1.0284	1.0286	1.0289	1.0292	1.0296
18	1.0259	1.0262	1.0266	1.0269	1.0272	1.0274	1.0277	1.0280	1.0283	1.0286	1.0290
19	1.0253	1.0256	1.0259	1.0262	1.0265	1.0268	1.0271	1.0273	1.0276	1.0279	1.0283
20	1.0247	1.0250	1.0253	1.0256	1.0259	1.0261	1.0264	1.0266	1.0269	1.0272	1.0276
21	1.0241	1.0244	1.0247	1.0250	1.0253	1.0255	1.0257	1.0259	1.0262	1.0265	1.0269
22	1.0235	1.0238	1.0241	1.0243	1.0246	1.0248	1.0251	1.0253	1.0256	1.0258	1.0262
23	1.0229	1.0231	1.0234	1.0237	1.0240	1.0242	1.0244	1.0246	1.0249	1.0252	1.0256
24	1.0223	1.0225	1.0228	1.0230	1.0233	1.0235	1.0238	1.0240	1.0243	1.0245	1.0249
25	1.0217	1.0219	1.0222	1.0224	1.0227	1.0229	1.0231	1.0233	1.0236	1.0238	1.0242
26	1.0211	1.0213	1.0216	1.0218	1.0220	1.0222	1.0224	1.0226	1.0229	1.0231	1.0235
27	1.0205	1.0207	1.0209	1.0211	1.0214	1.0216	1.0218	1.0220	1.0223	1.0225	1.0229
28	1.0198	1.0200	1.0203	1.0205	1.0207	1.0207	1.0211	1.0213	1.0216	1.0218	1.0222
29	1.0192	1.0194	1.0196	1.0198	1.0201	1.0203	1.0205	1.0207	1.0210		





Observed tempera- ture in °F	Degrees A. P. I. at 60°F										16.
	60	61	62	63	64	65	66	67	68	69	
	Volume at 60°F occupied by unit volume at indicated temperature										
65	0.9969	0.9969	0.9968	0.9968	0.9967	0.9967	0.9967	0.9967	0.9966	0.9966	
66	.9963	.9963	.9962	.9962	.9961	.9961	.9960	.9960	.9959	.9959	
67	.9957	.9956	.9955	.9955	.9954	.9954	.9954	.9953	.9952	.9952	
68	.9950	.9950	.9949	.9949	.9948	.9948	.9947	.9947	.9946	.9946	
69	.9944	.9943	.9942	.9942	.9941	.9941	.9941	.9940	.9939	.9939	
70	.9938	.9937	.9936	.9936	.9935	.9935	.9934	.9933	.9932	.9932	
71	.9932	.9931	.9930	.9929	.9928	.9928	.9927	.9926	.9925	.9925	
72	.9926	.9925	.9923	.9923	.9922	.9921	.9920	.9919	.9918	.9918	
73	.9919	.9918	.9917	.9916	.9915	.9915	.9914	.9913	.9912	.9911	
74	.9913	.9912	.9910	.9910	.9909	.9908	.9907	.9906	.9905	.9904	
75	.9907	.9906	.9904	.9903	.9902	.9901	.9900	.9899	.9898	.9897	
76	.9901	.9900	.9898	.9897	.9896	.9895	.9893	.9892	.9891	.9890	
77	.9895	.9894	.9892	.9891	.9889	.9888	.9887	.9886	.9884	.9883	
78	.9888	.9887	.9885	.9884	.9883	.9882	.9880	.9879	.9878	.9877	
79	.9882	.9881	.9879	.9878	.9876	.9875	.9874	.9873	.9871	.9870	
80	.9876	.9875	.9873	.9872	.9870	.9869	.9867	.9866	.9864	.9863	
81	.9870	.9869	.9867	.9866	.9863	.9862	.9860	.9859	.9857	.9856	
82	.9863	.9862	.9860	.9859	.9857	.9856	.9854	.9852	.9850	.9849	
83	.9857	.9856	.9854	.9852	.9850	.9849	.9847	.9846	.9844	.9842	
84	.9850	.9849	.9847	.9846	.9844	.9843	.9841	.9839	.9837	.9835	
85	.9844	.9843	.9841	.9839	.9837	.9836	.9834	.9832	.9830	.9828	
86	.9838	.9837	.9835	.9833	.9830	.9829	.9827	.9825	.9823	.9821	
87	.9832	.9830	.9828	.9826	.9824	.9822	.9820	.9818	.9816	.9814	
88	.9825	.9824	.9822	.9820	.9817	.9816	.9814	.9812	.9810	.9808	
89	.9819	.9817	.9815	.9813	.9811	.9809	.9807	.9805	.9803	.9801	
90	.9813	.9811	.9809	.9807	.9804	.9802	.9800	.9798	.9796	.9794	
91	.9807	.9805	.9803	.9801	.9798	.9796	.9793	.9791	.9789	.9787	
92	.9801	.9799	.9796	.9794	.9791	.9789	.9787	.9785	.9782	.9780	
93	.9794	.9792	.9790	.9788	.9785	.9783	.9780	.9778	.9776	.9774	
94	.9788	.9786	.9783	.9781	.9778	.9776	.9774	.9772	.9769	.9767	
95	.9782	.9780	.9777	.9775	.9772	.9770	.9767	.9765	.9762	.9760	
96	.9776	.9774	.9771	.9768	.9765	.9763	.9760	.9758	.9755	.9753	
97	.9770	.9767	.9764	.9762	.9759	.9756	.9753	.9751	.9748	.9746	
98	.9763	.9761	.9758	.9755	.9752	.9750	.9747	.9745	.9742	.9739	
99	.9757	.9754	.9751	.9749	.9746	.9743	.9740	.9738	.9735	.9732	
100	.9751	.9748	.9745	.9742	.9739	.9736	.9733	.9731	.9728	.9725	
101	.9745	.9742	.9739	.9736	.9733	.9730	.9726	.9724	.9721	.9718	
102	.9739	.9736	.9732	.9729	.9726	.9723	.9720	.9717	.9714	.9711	
103	.9732	.9729	.9726	.9723	.9720	.9717	.9713	.9711	.9708	.9705	
104	.9726	.9723	.9719	.9716	.9713	.9710	.9707	.9704	.9701	.9698	
105	.9720	.9717	.9713	.9710	.9707	.9704	.9700	.9697	.9694	.9691	
106	.9714	.9711	.9707	.9704	.9700	.9697	.9693	.9690	.9687	.9684	
107	.9708	.9704	.9700	.9697	.9694	.9690	.9686	.9683	.9680	.9677	
108	.9701	.9698	.9694	.9691	.9687	.9684	.9680	.9677	.9673	.9670	
109	.9695	.9691	.9687	.9684	.9681	.9677	.9673	.9670	.9666	.9663	
110	.9689	.9685	.9681	.9678	.9674	.9670	.9666	.9663	.9659	.9656	
111	.9683	.9679	.9675	.9671	.9667	.9663	.9659	.9656	.9652	.9649	
112	.9676	.9672	.9668	.9665	.9661	.9657	.9653	.9649	.9645	.9642	
113	.9670	.9666	.9662	.9658	.9654	.9650	.9646	.9643	.9639	.9635	
114	.9663	.9659	.9655	.9652	.9648	.9644	.9640	.9636	.9632	.9628	
115	.9657	.9653	.9649	.9645	.9641	.9637	.9633	.9629	.9625	.9621	
116	.9651	.9647	.9643	.9639	.9634	.9630	.9626	.9622	.9618	.9614	
117	.9645	.9641	.9636	.9632	.9628	.9624	.9619	.9615	.9611	.9607	
118	.9638	.9634	.9630	.9626	.9621	.9617	.9613	.9609	.9605	.9601	
119	.9632	.9628	.9623	.9619	.9615	.9611	.9606	.9602	.9598	.9594	
120	.9626	.9622	.9617	.9613	.9608	.9604	.9599	.9595	.9591	.9587	
121	.9620	.9616	.9611	.9607	.9602	.9597	.9592	.9588	.9584	.9580	
122	.9614	.9609	.9604	.9600	.9595	.9591	.9586	.9582	.9577	.9573	
123	.9607	.9603	.9598	.9594	.9589	.9584	.9579	.9575	.9571	.9566	
124	.9601	.9596	.9591	.9587	.9582	.9578	.9573	.9569	.9564	.9559	
125	.9595	.9590	.9585	.9581	.9576	.9571	.9566	.9562	.9557	.9552	



## Degrees A.P.I. at 60°F

Observed  
tempera-  
ture in  
°F

70 71 72 73 74 75 76 77 78 79

Volume at 60°F occupied by unit volume at indicated temperature

0	1.0411	1.0415	1.0419	1.0422	1.0426	1.0430	1.0434	1.0438	1.0443	1.0447
1	1.0404	1.0408	1.0412	1.0415	1.0419	1.0423	1.0427	1.0431	1.0436	1.0440
2	1.0397	1.0401	1.0405	1.0408	1.0412	1.0416	1.0420	1.0424	1.0429	1.0432
3	1.0391	1.0394	1.0398	1.0401	1.0405	1.0409	1.0413	1.0417	1.0421	1.0425
4	1.0384	1.0387	1.0391	1.0394	1.0398	1.0402	1.0406	1.0410	1.0414	1.0417
5	1.0377	1.0380	1.0384	1.0387	1.0391	1.0395	1.0399	1.0403	1.0407	1.0410
6	1.0370	1.0373	1.0377	1.0380	1.0384	1.0388	1.0392	1.0396	1.0400	1.0403
7	1.0363	1.0366	1.0370	1.0373	1.0377	1.0381	1.0385	1.0388	1.0392	1.0395
8	1.0357	1.0360	1.0364	1.0367	1.0370	1.0373	1.0377	1.0381	1.0385	1.0388
9	1.0350	1.0353	1.0357	1.0360	1.0363	1.0366	1.0370	1.0373	1.0377	1.0380
10	1.0343	1.0346	1.0350	1.0353	1.0356	1.0359	1.0363	1.0366	1.0370	1.0373
11	1.0336	1.0339	1.0343	1.0346	1.0349	1.0352	1.0356	1.0359	1.0363	1.0366
12	1.0329	1.0332	1.0336	1.0339	1.0342	1.0345	1.0349	1.0352	1.0356	1.0359
13	1.0323	1.0326	1.0329	1.0332	1.0335	1.0338	1.0341	1.0344	1.0348	1.0351
14	1.0316	1.0319	1.0322	1.0325	1.0328	1.0331	1.0334	1.0337	1.0341	1.0344
15	1.0309	1.0312	1.0315	1.0318	1.0321	1.0324	1.0327	1.0330	1.0334	1.0337
16	1.0302	1.0305	1.0308	1.0311	1.0314	1.0317	1.0320	1.0323	1.0327	1.0329
17	1.0295	1.0298	1.0301	1.0304	1.0307	1.0310	1.0313	1.0316	1.0319	1.0322
18	1.0289	1.0291	1.0294	1.0297	1.0299	1.0302	1.0305	1.0308	1.0312	1.0314
19	1.0282	1.0284	1.0287	1.0290	1.0292	1.0295	1.0298	1.0301	1.0304	1.0307
20	1.0275	1.0277	1.0280	1.0283	1.0285	1.0288	1.0291	1.0294	1.0297	1.0299
21	1.0268	1.0270	1.0273	1.0276	1.0278	1.0281	1.0284	1.0287	1.0290	1.0292
22	1.0261	1.0263	1.0266	1.0269	1.0271	1.0274	1.0277	1.0279	1.0282	1.0284
23	1.0255	1.0257	1.0260	1.0262	1.0264	1.0266	1.0269	1.0272	1.0275	1.0277
24	1.0248	1.0250	1.0253	1.0255	1.0257	1.0259	1.0262	1.0264	1.0267	1.0269
25	1.0241	1.0243	1.0246	1.0248	1.0250	1.0252	1.0255	1.0257	1.0260	1.0262
26	1.0234	1.0236	1.0239	1.0241	1.0243	1.0245	1.0248	1.0250	1.0253	1.0255
27	1.0227	1.0229	1.0232	1.0234	1.0236	1.0238	1.0241	1.0243	1.0245	1.0247
28	1.0221	1.0223	1.0225	1.0227	1.0229	1.0231	1.0233	1.0235	1.0238	1.0240
29	1.0214	1.0216	1.0218	1.0220	1.0222	1.0224	1.0226	1.0228	1.0230	1.0232
30	1.0207	1.0209	1.0211	1.0213	1.0215	1.0217	1.0219	1.0221	1.0223	1.0225
31	1.0200	1.0202	1.0204	1.0206	1.0208	1.0210	1.0212	1.0214	1.0216	1.0218
32	1.0193	1.0195	1.0197	1.0199	1.0201	1.0202	1.0204	1.0206	1.0208	1.0210
33	1.0186	1.0188	1.0190	1.0191	1.0193	1.0195	1.0197	1.0199	1.0201	1.0203
34	1.0179	1.0181	1.0183	1.0184	1.0186	1.0187	1.0189	1.0191	1.0193	1.0195
35	1.0172	1.0174	1.0176	1.0177	1.0179	1.0180	1.0182	1.0184	1.0186	1.0188
36	1.0165	1.0167	1.0169	1.0170	1.0172	1.0173	1.0175	1.0177	1.0179	1.0180
37	1.0158	1.0160	1.0162	1.0163	1.0165	1.0166	1.0168	1.0169	1.0171	1.0173
38	1.0152	1.0153	1.0155	1.0156	1.0157	1.0158	1.0160	1.0162	1.0164	1.0165
39	1.0145	1.0146	1.0148	1.0149	1.0150	1.0151	1.0153	1.0154	1.0156	1.0158
40	1.0138	1.0139	1.0141	1.0142	1.0143	1.0144	1.0146	1.0147	1.0149	1.0150
41	1.0131	1.0132	1.0134	1.0135	1.0136	1.0137	1.0139	1.0140	1.0142	1.0143
42	1.0124	1.0125	1.0127	1.0128	1.0129	1.0130	1.0132	1.0133	1.0134	1.0135
43	1.0118	1.0119	1.0120	1.0121	1.0122	1.0123	1.0124	1.0125	1.0127	1.0128
44	1.0111	1.0112	1.0113	1.0114	1.0115	1.0116	1.0117	1.0118	1.0119	1.0120





## Degrees A.P.I. at 60°F

Observed  
tempera-  
ture in  
°F70 71 72 73 74 75 76 77 78 79  
Volume at 60°F occupied by unit volume at indicated temperature

45	1.0104	1.0105	1.0106	1.0107	1.0108	1.0109	1.0110	1.0111	1.0112	1.0113
46	1.0097	1.0098	1.0099	1.0100	1.0101	1.0102	1.0103	1.0104	1.0105	1.0105
47	1.0090	1.0091	1.0092	1.0093	1.0094	1.0094	1.0095	1.0096	1.0097	1.0098
48	1.0083	1.0083	1.0084	1.0085	1.0086	1.0087	1.0088	1.0089	1.0090	1.0090
49	1.0076	1.0076	1.0077	1.0078	1.0079	1.0079	1.0080	1.0081	1.0082	1.0083
50	1.0069	1.0069	1.0070	1.0071	1.0072	1.0072	1.0073	1.0074	1.0075	1.0075
51	1.0062	1.0062	1.0063	1.0064	1.0065	1.0065	1.0066	1.0066	1.0067	1.0067
52	1.0055	1.0055	1.0056	1.0057	1.0058	1.0058	1.0059	1.0059	1.0060	1.0060
53	1.0049	1.0049	1.0049	1.0049	1.0049	1.0050	1.0051	1.0051	1.0052	1.0052
54	1.0042	1.0042	1.0042	1.0042	1.0043	1.0043	1.0044	1.0044	1.0045	1.0045
55	1.0035	1.0035	1.0035	1.0035	1.0036	1.0036	1.0037	1.0037	1.0037	1.0037
56	1.0028	1.0028	1.0028	1.0028	1.0029	1.0029	1.0030	1.0030	1.0030	1.0030
57	1.0021	1.0021	1.0021	1.0021	1.0022	1.0022	1.0022	1.0022	1.0022	1.0022
58	1.0014	1.0014	1.0014	1.0014	1.0014	1.0014	1.0015	1.0015	1.0015	1.0015
59	1.0007	1.0007	1.0007	1.0007	1.0007	1.0007	1.0007	1.0007	1.0007	1.0007
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
61	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993
62	.9986	.9986	.9986	.9986	.9986	.9986	.9985	.9985	.9985	.9985
63	.9979	.9979	.9979	.9979	.9978	.9978	.9978	.9978	.9978	.9978
64	.9972	.9972	.9972	.9972	.9971	.9971	.9970	.9970	.9970	.9970
65	.9965	.9965	.9965	.9965	.9964	.9964	.9963	.9963	.9963	.9963
66	.9958	.9958	.9958	.9958	.9957	.9957	.9956	.9956	.9955	.9955
67	.9951	.9951	.9951	.9951	.9950	.9949	.9948	.9948	.9948	.9948
68	.9945	.9944	.9943	.9943	.9942	.9942	.9941	.9941	.9940	.9940
69	.9938	.9937	.9936	.9936	.9935	.9934	.9933	.9933	.9933	.9933
70	.9931	.9930	.9929	.9929	.9928	.9927	.9926	.9926	.9925	.9925
71	.9924	.9923	.9922	.9922	.9921	.9920	.9919	.9919	.9918	.9917
72	.9917	.9916	.9915	.9915	.9914	.9913	.9912	.9911	.9910	.9909
73	.9910	.9909	.9908	.9907	.9906	.9905	.9904	.9904	.9903	.9902
74	.9903	.9902	.9901	.9900	.9899	.9898	.9897	.9896	.9895	.9894
75	.9896	.9895	.9894	.9893	.9892	.9891	.9890	.9889	.9888	.9887
76	.9889	.9888	.9887	.9886	.9885	.9884	.9883	.9882	.9880	.9879
77	.9882	.9881	.9880	.9879	.9878	.9877	.9875	.9874	.9873	.9872
78	.9875	.9874	.9872	.9871	.9870	.9869	.9868	.9867	.9865	.9864
79	.9868	.9867	.9865	.9864	.9863	.9862	.9860	.9859	.9858	.9857
80	.9861	.9860	.9858	.9857	.9856	.9855	.9853	.9852	.9850	.9849
81	.9854	.9853	.9851	.9850	.9849	.9848	.9846	.9844	.9842	.9841
82	.9847	.9846	.9844	.9843	.9842	.9840	.9838	.9837	.9835	.9834
83	.9840	.9839	.9837	.9836	.9834	.9833	.9831	.9829	.9827	.9826
84	.9833	.9832	.9830	.9829	.9827	.9825	.9823	.9822	.9820	.9819
85	.9826	.9825	.9823	.9822	.9820	.9818	.9816	.9814	.9812	.9811
86	.9819	.9818	.9816	.9815	.9813	.9811	.9809	.9807	.9805	.9803
87	.9812	.9811	.9809	.9808	.9806	.9804	.9801	.9799	.9797	.9795
88	.9806	.9804	.9802	.9800	.9798	.9796	.9794	.9792	.9790	.9788
89	.9799	.9797	.9795	.9793	.9791	.9789	.9786	.9784	.9782	.9780
90	.9792	.9790	.9788	.9786	.9784	.9782	.9779	.9777	.9775	.9773





Observed tempera- ture in °F	Degrees A.P.I. at 60°F									
	80	81	82	83	84	85	86	87	88	89
	Volume at 60°F occupied by unit volume at indicated temperature									
0	1.0451	1.0455	1.0459	1.0463	1.0467	1.0471	1.0476	1.0480	1.0485	1.0490
1	1.0444	1.0448	1.0452	1.0455	1.0459	1.0463	1.0468	1.0472	1.0477	1.0482
2	1.0436	1.0440	1.0444	1.0448	1.0452	1.0456	1.0460	1.0464	1.0469	1.0474
3	1.0429	1.0433	1.0437	1.0440	1.0444	1.0448	1.0453	1.0457	1.0461	1.0466
4	1.0421	1.0425	1.0429	1.0433	1.0437	1.0441	1.0445	1.0449	1.0453	1.0458
5	1.0414	1.0418	1.0422	1.0425	1.0429	1.0433	1.0437	1.0441	1.0445	1.0450
6	1.0407	1.0410	1.0414	1.0417	1.0421	1.0425	1.0429	1.0433	1.0437	1.0442
7	1.0399	1.0403	1.0407	1.0410	1.0413	1.0417	1.0421	1.0425	1.0429	1.0434
8	1.0392	1.0395	1.0399	1.0402	1.0406	1.0410	1.0414	1.0417	1.0421	1.0425
9	1.0384	1.0388	1.0392	1.0395	1.0398	1.0402	1.0406	1.0409	1.0413	1.0417
10	1.0377	1.0380	1.0384	1.0387	1.0390	1.0394	1.0398	1.0401	1.0405	1.0409
11	1.0370	1.0373	1.0376	1.0379	1.0382	1.0386	1.0390	1.0393	1.0397	1.0401
12	1.0362	1.0365	1.0369	1.0372	1.0375	1.0378	1.0382	1.0385	1.0389	1.0393
13	1.0355	1.0358	1.0361	1.0364	1.0367	1.0371	1.0375	1.0378	1.0381	1.0385
14	1.0347	1.0350	1.0354	1.0357	1.0360	1.0363	1.0367	1.0370	1.0373	1.0377
15	1.0340	1.0343	1.0346	1.0349	1.0352	1.0355	1.0359	1.0362	1.0365	1.0369
16	1.0332	1.0335	1.0338	1.0341	1.0344	1.0347	1.0351	1.0354	1.0357	1.0361
17	1.0325	1.0328	1.0331	1.0333	1.0336	1.0339	1.0343	1.0346	1.0349	1.0353
18	1.0317	1.0320	1.0323	1.0326	1.0329	1.0332	1.0335	1.0338	1.0341	1.0344
19	1.0310	1.0313	1.0316	1.0318	1.0321	1.0324	1.0327	1.0330	1.0333	1.0336
20	1.0302	1.0305	1.0308	1.0310	1.0313	1.0316	1.0319	1.0322	1.0325	1.0328
21	1.0295	1.0297	1.0300	1.0302	1.0305	1.0308	1.0311	1.0314	1.0317	1.0320
22	1.0287	1.0290	1.0293	1.0295	1.0297	1.0300	1.0303	1.0306	1.0309	1.0312
23	1.0280	1.0282	1.0285	1.0287	1.0290	1.0293	1.0296	1.0298	1.0301	1.0304
24	1.0272	1.0275	1.0278	1.0280	1.0282	1.0285	1.0288	1.0290	1.0293	1.0296
25	1.0265	1.0267	1.0270	1.0272	1.0274	1.0277	1.0280	1.0282	1.0285	1.0288
26	1.0257	1.0259	1.0262	1.0264	1.0266	1.0269	1.0272	1.0274	1.0277	1.0280
27	1.0250	1.0252	1.0254	1.0256	1.0258	1.0261	1.0264	1.0266	1.0269	1.0272
28	1.0242	1.0244	1.0247	1.0249	1.0251	1.0253	1.0256	1.0258	1.0261	1.0263
29	1.0235	1.0237	1.0239	1.0241	1.0243	1.0245	1.0248	1.0250	1.0253	1.0255
30	1.0227	1.0229	1.0231	1.0233	1.0235	1.0237	1.0240	1.0242	1.0245	1.0247
31	1.0220	1.0221	1.0223	1.0225	1.0227	1.0229	1.0232	1.0234	1.0237	1.0239
32	1.0212	1.0214	1.0216	1.0217	1.0219	1.0221	1.0224	1.0226	1.0229	1.0231
33	1.0205	1.0206	1.0208	1.0210	1.0212	1.0214	1.0216	1.0218	1.0220	1.0222
34	1.0197	1.0199	1.0201	1.0202	1.0204	1.0206	1.0208	1.0210	1.0212	1.0214
35	1.0190	1.0191	1.0193	1.0194	1.0196	1.0198	1.0200	1.0202	1.0204	1.0206
36	1.0182	1.0183	1.0185	1.0186	1.0188	1.0190	1.0192	1.0194	1.0196	1.0198
37	1.0175	1.0176	1.0178	1.0179	1.0180	1.0182	1.0184	1.0186	1.0188	1.0190
38	1.0167	1.0168	1.0170	1.0171	1.0173	1.0174	1.0176	1.0178	1.0180	1.0182
39	1.0160	1.0161	1.0163	1.0164	1.0165	1.0166	1.0168	1.0170	1.0172	1.0173
40	1.0152	1.0153	1.0155	1.0156	1.0157	1.0158	1.0160	1.0162	1.0164	1.0165
41	1.0144	1.0145	1.0147	1.0148	1.0149	1.0150	1.0152	1.0154	1.0156	1.0157
42	1.0137	1.0138	1.0139	1.0140	1.0141	1.0142	1.0144	1.0146	1.0148	1.0149
43	1.0129	1.0130	1.0132	1.0133	1.0134	1.0135	1.0136	1.0137	1.0139	1.0140
44	1.0122	1.0123	1.0124	1.0125	1.0126	1.0127	1.0128	1.0129	1.0131	1.0132



Observed tempera- ture in °F	Degrees A.P.I. at 60°F									
	80	81	82	83	84	85	86	87	88	89
	Volume at 60°F occupied by unit volume at indicated temperature.									
45	1.0114	1.0115	1.0116	1.0117	1.0118	1.0119	1.0120	1.0121	1.0123	1.0124
46	1.0106	1.0107	1.0108	1.0109	1.0110	1.0111	1.0112	1.0113	1.0115	1.0116
47	1.0099	1.0099	1.0100	1.0101	1.0102	1.0103	1.0104	1.0105	1.0107	1.0108
48	1.0091	1.0092	1.0093	1.0094	1.0095	1.0095	1.0096	1.0097	1.0098	1.0099
49	1.0084	1.0084	1.0085	1.0086	1.0087	1.0087	1.0088	1.0089	1.0090	1.0091
50	1.0076	1.0076	1.0077	1.0078	1.0079	1.0079	1.0080	1.0081	1.0082	1.0083
51	1.0068	1.0068	1.0069	1.0070	1.0071	1.0071	1.0072	1.0073	1.0074	1.0075
52	1.0061	1.0061	1.0062	1.0062	1.0063	1.0063	1.0064	1.0065	1.0066	1.0066
53	1.0053	1.0053	1.0054	1.0055	1.0056	1.0056	1.0056	1.0056	1.0057	1.0058
54	1.0046	1.0046	1.0047	1.0047	1.0048	1.0048	1.0048	1.0048	1.0049	1.0049
55	1.0038	1.0038	1.0039	1.0039	1.0040	1.0040	1.0040	1.0040	1.0041	1.0041
56	1.0030	1.0030	1.0031	1.0031	1.0032	1.0032	1.0032	1.0032	1.0033	1.0033
57	1.0023	1.0023	1.0023	1.0023	1.0024	1.0024	1.0024	1.0024	1.0025	1.0025
58	1.0015	1.0015	1.0016	1.0016	1.0016	1.0016	1.0016	1.0016	1.0016	1.0016
59	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008	1.0008
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
61	.9992	.9992	.9992	.9992	.9992	.9992	.9992	.9992	.9992	.9992
62	.9985	.9985	.9984	.9984	.9984	.9984	.9984	.9984	.9984	.9984
63	.9977	.9977	.9977	.9977	.9977	.9977	.9976	.9976	.9975	.9975
64	.9970	.9970	.9969	.9969	.9969	.9969	.9968	.9968	.9967	.9967
65	.9962	.9962	.9961	.9961	.9961	.9961	.9960	.9960	.9959	.9959
66	.9954	.9954	.9953	.9953	.9953	.9953	.9952	.9952	.9951	.9951
67	.9947	.9946	.9945	.9945	.9945	.9945	.9944	.9944	.9943	.9942
68	.9939	.9939	.9938	.9938	.9937	.9936	.9935	.9935	.9934	.9934
69	.9932	.9931	.9930	.9930	.9929	.9928	.9927	.9927	.9926	.9925
70	.9924	.9923	.9922	.9922	.9921	.9920	.9919	.9919	.9918	.9917
71	.9916	.9915	.9914	.9914	.9913	.9912	.9911	.9911	.9910	.9909
72	.9908	.9907	.9906	.9906	.9905	.9904	.9903	.9903	.9902	.9901
73	.9901	.9900	.9899	.9898	.9897	.9896	.9895	.9894	.9893	.9892
74	.9893	.9892	.9891	.9890	.9889	.9888	.9887	.9886	.9885	.9884
75	.9885	.9884	.9883	.9882	.9881	.9880	.9879	.9878	.9877	.9876
76	.9877	.9876	.9875	.9874	.9873	.9872	.9871	.9870	.9869	.9868
77	.9870	.9869	.9867	.9866	.9865	.9864	.9863	.9862	.9860	.9859
78	.9862	.9861	.9860	.9859	.9857	.9856	.9854	.9853	.9852	.9851
79	.9855	.9854	.9852	.9851	.9849	.9848	.9846	.9845	.9843	.9842
80	.9847	.9846	.9844	.9843	.9841	.9840	.9838	.9837	.9835	.9834
81	.9839	.9838	.9836	.9835	.9833	.9832	.9830	.9829	.9827	.9825
82	.9832	.9830	.9828	.9827	.9825	.9824	.9822	.9821	.9819	.9817
83	.9824	.9823	.9821	.9820	.9818	.9816	.9814	.9812	.9810	.9808
84	.9817	.9815	.9813	.9812	.9810	.9808	.9806	.9804	.9802	.9800
85	.9809	.9807	.9805	.9804	.9802	.9800	.9798	.9796	.9794	.9792
86	.9801	.9799	.9797	.9796	.9794	.9792	.9790	.9788	.9786	.9784
87	.9793	.9791	.9789	.9788	.9786	.9784	.9782	.9780	.9778	.9775
88	.9786	.9784	.9782	.9780	.9778	.9776	.9773	.9771	.9769	.9767
89	.9778	.9776	.9774	.9772	.9770	.9768	.9765	.9763	.9761	.9758
90	.9770	.9768	.9766	.9764	.9762	.9760	.9757	.9755	.9753	.9750





## Degrees A.P.I. at 60°F

Observed  
tempera-  
ture in  
°F

90 91 92 93 94 95 96 97 98 99

Volume at 60°F occupied by unit volume at indicated temperature.

0	1.0496	1.0501	1.0506	1.0511	1.0516	1.0521	1.0526	1.0531	1.0536	1.0541
1	1.0488	1.0493	1.0498	1.0503	1.0508	1.0512	1.0517	1.0522	1.0527	1.0532
2	1.0480	1.0484	1.0489	1.0494	1.0499	1.0504	1.0509	1.0513	1.0518	1.0523
3	1.0471	1.0476	1.0481	1.0486	1.0491	1.0495	1.0500	1.0505	1.0510	1.0515
4	1.0463	1.0467	1.0472	1.0477	1.0482	1.0487	1.0492	1.0496	1.0501	1.0506
5	1.0455	1.0459	1.0464	1.0469	1.0474	1.0478	1.0483	1.0487	1.0492	1.0497
6	1.0447	1.0451	1.0456	1.0460	1.0465	1.0469	1.0474	1.0478	1.0483	1.0488
7	1.0439	1.0443	1.0447	1.0452	1.0457	1.0461	1.0466	1.0470	1.0474	1.0479
8	1.0430	1.0434	1.0439	1.0443	1.0448	1.0452	1.0457	1.0461	1.0466	1.0470
9	1.0422	1.0426	1.0430	1.0435	1.0440	1.0444	1.0449	1.0453	1.0457	1.0461
10	1.0414	1.0418	1.0422	1.0426	1.0431	1.0435	1.0440	1.0444	1.0448	1.0452
11	1.0406	1.0410	1.0414	1.0418	1.0423	1.0427	1.0431	1.0435	1.0439	1.0443
12	1.0398	1.0402	1.0406	1.0410	1.0414	1.0418	1.0423	1.0426	1.0430	1.0434
13	1.0389	1.0393	1.0397	1.0401	1.0406	1.0410	1.0414	1.0418	1.0422	1.0426
14	1.0381	1.0385	1.0389	1.0393	1.0397	1.0401	1.0406	1.0409	1.0413	1.0417
15	1.0373	1.0377	1.0381	1.0385	1.0389	1.0393	1.0397	1.0400	1.0404	1.0408
16	1.0365	1.0369	1.0373	1.0376	1.0380	1.0384	1.0388	1.0391	1.0395	1.0399
17	1.0357	1.0360	1.0364	1.0368	1.0372	1.0375	1.0379	1.0382	1.0386	1.0390
18	1.0348	1.0352	1.0356	1.0359	1.0363	1.0367	1.0371	1.0374	1.0378	1.0381
19	1.0340	1.0343	1.0347	1.0351	1.0355	1.0358	1.0362	1.0365	1.0369	1.0372
20	1.0332	1.0335	1.0339	1.0342	1.0346	1.0349	1.0353	1.0356	1.0360	1.0363
21	1.0324	1.0327	1.0331	1.0334	1.0337	1.0340	1.0344	1.0347	1.0351	1.0354
22	1.0316	1.0319	1.0322	1.0325	1.0329	1.0332	1.0335	1.0338	1.0342	1.0345
23	1.0307	1.0310	1.0314	1.0317	1.0320	1.0323	1.0327	1.0330	1.0333	1.0336
24	1.0299	1.0302	1.0305	1.0308	1.0312	1.0315	1.0318	1.0321	1.0324	1.0327
25	1.0291	1.0294	1.0297	1.0300	1.0303	1.0306	1.0309	1.0312	1.0315	1.0318
26	1.0283	1.0286	1.0289	1.0291	1.0294	1.0297	1.0300	1.0303	1.0306	1.0309
27	1.0275	1.0277	1.0280	1.0283	1.0286	1.0289	1.0292	1.0294	1.0297	1.0300
28	1.0266	1.0269	1.0272	1.0274	1.0277	1.0280	1.0283	1.0286	1.0289	1.0291
29	1.0258	1.0260	1.0263	1.0266	1.0269	1.0272	1.0275	1.0277	1.0280	1.0282
30	1.0250	1.0252	1.0255	1.0257	1.0260	1.0263	1.0266	1.0268	1.0271	1.0273
31	1.0242	1.0244	1.0247	1.0249	1.0251	1.0254	1.0257	1.0259	1.0262	1.0264
32	1.0234	1.0236	1.0238	1.0240	1.0243	1.0245	1.0248	1.0250	1.0253	1.0255
33	1.0225	1.0227	1.0230	1.0232	1.0234	1.0237	1.0240	1.0242	1.0244	1.0246
34	1.0217	1.0219	1.0221	1.0223	1.0226	1.0228	1.0231	1.0233	1.0235	1.0237
35	1.0209	1.0211	1.0213	1.0215	1.0217	1.0219	1.0222	1.0224	1.0226	1.0228
36	1.0201	1.0203	1.0205	1.0206	1.0208	1.0210	1.0213	1.0215	1.0217	1.0219
37	1.0192	1.0194	1.0196	1.0198	1.0200	1.0202	1.0204	1.0206	1.0208	1.0210
38	1.0184	1.0186	1.0188	1.0189	1.0191	1.0193	1.0196	1.0197	1.0199	1.0200
39	1.0175	1.0177	1.0179	1.0181	1.0183	1.0185	1.0187	1.0188	1.0190	1.0191
40	1.0167	1.0169	1.0171	1.0172	1.0174	1.0176	1.0178	1.0179	1.0181	1.0182
41	1.0159	1.0160	1.0162	1.0163	1.0165	1.0167	1.0169	1.0170	1.0172	1.0173
42	1.0150	1.0152	1.0154	1.0155	1.0157	1.0158	1.0160	1.0161	1.0163	1.0164
43	1.0142	1.0143	1.0145	1.0146	1.0148	1.0149	1.0151	1.0152	1.0154	1.0155
44	1.0133	1.0135	1.0137	1.0138	1.0140	1.0141	1.0142	1.0143	1.0145	1.0146





## Degrees A. P. I. at 60°F

Observed  
tempera-  
ture in  
°F

90 91 92 93 94 95 96 97 98 99

Volume at 60°F occupied by unit volume at indicated temperature.

45	1.0125	1.0126	1.0128	1.0129	1.0131	1.0132	1.0133	1.0134	1.0136	1.0137
46	1.0117	1.0118	1.0119	1.0120	1.0122	1.0123	1.0124	1.0125	1.0127	1.0128
47	1.0109	1.0110	1.0111	1.0112	1.0113	1.0114	1.0115	1.0116	1.0118	1.0119
48	1.0100	1.0101	1.0102	1.0103	1.0105	1.0106	1.0107	1.0108	1.0109	1.0109
49	1.0092	1.0093	1.0094	1.0095	1.0096	1.0097	1.0098	1.0099	1.0100	1.0100
50	1.0084	1.0084	1.0085	1.0086	1.0087	1.0088	1.0089	1.0090	1.0091	1.0091
51	1.0076	1.0076	1.0077	1.0077	1.0078	1.0079	1.0080	1.0081	1.0082	1.0082
52	1.0067	1.0067	1.0068	1.0069	1.0070	1.0070	1.0071	1.0072	1.0073	1.0073
53	1.0059	1.0059	1.0060	1.0060	1.0061	1.0062	1.0063	1.0062	1.0063	1.0063
54	1.0050	1.0050	1.0051	1.0052	1.0053	1.0053	1.0054	1.0054	1.0054	1.0054
55	1.0042	1.0042	1.0043	1.0043	1.0044	1.0044	1.0045	1.0045	1.0045	1.0045
56	1.0034	1.0034	1.0034	1.0034	1.0035	1.0035	1.0036	1.0036	1.0036	1.0036
57	1.0025	1.0025	1.0026	1.0026	1.0026	1.0026	1.0027	1.0027	1.0027	1.0027
58	1.0017	1.0017	1.0017	1.0017	1.0018	1.0018	1.0018	1.0018	1.0018	1.0018
59	1.0008	1.0008	1.0009	1.0009	1.0009	1.0009	1.0009	1.0009	1.0009	1.0009
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
61	0.9992	0.9992	0.9991	0.9991	0.9991	0.9991	0.9991	0.9991	0.9991	0.9991
62	.9983	.9983	.9983	.9983	.9982	.9982	.9982	.9982	.9982	.9982
63	.9975	.9975	.9974	.9974	.9974	.9974	.9973	.9973	.9972	.9972
64	.9966	.9966	.9966	.9966	.9965	.9965	.9964	.9964	.9963	.9963
65	0.9958	.9958	0.9957	.9957	0.9956	.9956	0.9955	.9955	0.9954	.9954
66	.9950	.9949	.9948	.9948	.9947	.9947	.9946	.9946	.9945	.9945
67	.9941	.9941	.9940	.9940	.9939	.9938	.9937	.9937	.9936	.9936
68	.9933	.9932	.9931	.9931	.9930	.9930	.9929	.9928	.9927	.9927
69	.9924	.9924	.9923	.9923	.9922	.9921	.9920	.9919	.9918	.9917
70	.9916	.9915	.9914	.9914	.9913	.9912	.9911	.9910	.9909	.9908
71	.9908	.9907	.9905	.9905	.9904	.9903	.9902	.9901	.9900	.9899
72	.9899	.9898	.9897	.9896	.9895	.9894	.9893	.9892	.9891	.9890
73	.9891	.9890	.9888	.9888	.9887	.9886	.9884	.9883	.9881	.9880
74	.9882	.9881	.9880	.9879	.9878	.9877	.9875	.9874	.9872	.9871
75	.9874	.9873	.9871	.9870	.9869	.9868	.9866	.9865	.9863	.9862
76	.9866	.9864	.9862	.9861	.9860	.9859	.9857	.9856	.9854	.9853
77	.9857	.9856	.9854	.9853	.9851	.9850	.9848	.9847	.9845	.9844
78	.9849	.9847	.9845	.9844	.9843	.9841	.9839	.9838	.9836	.9835
79	.9840	.9839	.9837	.9836	.9834	.9832	.9830	.9829	.9827	.9825
80	.9832	.9830	.9828	.9827	.9825	.9823	.9821	.9820	.9818	.9816
81	.9823	.9821	.9819	.9818	.9816	.9814	.9812	.9811	.9809	.9807
82	.9815	.9813	.9811	.9809	.9807	.9805	.9803	.9802	.9800	.9798
83	.9806	.9804	.9802	.9801	.9799	.9797	.9794	.9792	.9790	.9788
84	.9798	.9796	.9794	.9792	.9790	.9788	.9785	.9783	.9781	.9779
85	.9789	.9787	.9785	.9783	.9781	.9779	.9776	.9774	.9772	.9770
86	.9781	.9779	.9776	.9774	.9772	.9770	.9767	.9765	.9763	.9761
87	.9772	.9770	.9768	.9766	.9763	.9761	.9758	.9756	.9754	.9751
88	.9764	.9762	.9759	.9757	.9754	.9752	.9749	.9747	.9744	.9742
89	.9755	.9753	.9751	.9748	.9745	.9743	.9740	.9738	.9735	.9732
90	.9747	.9745	.9742	.9739	.9736	.9734	.9731	.9729	.9726	.9723

